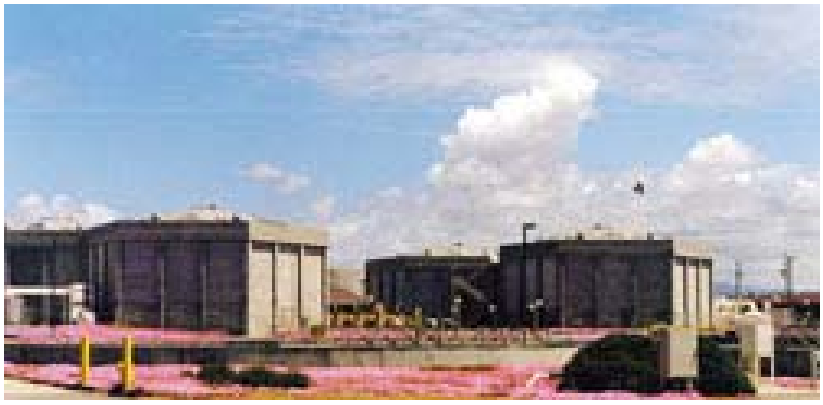
Local Hazard Mitigation Plan

MRWPCA

The Monterey Regional Water Pollution Control Agency

Local Hazard Mitigation Plan



MRWPCA Board of Directors

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- Dewey Baird, U.S. Army, Presidio of Monterey

For further information contact:
Safety Officer,
5 Harris Court, Building D, Monterey, CA 93940
(831) 883-1118

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FOR THE MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY
(MRWPCA)

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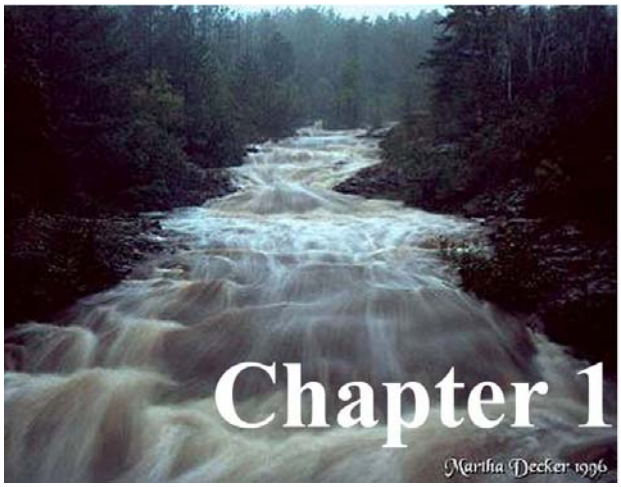


Adoption by the Local Governing Body

Section A. Resolution of the Monterey Water Pollution Control Agency Board of Directors

Section A. Board of Directors Resolution

RESOLUTION NO. 2005 - __

A RESOLUTION OF THE MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY ADOPTING THE MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY LOCAL HAZARD MITIGATION PLAN

-o0o-

WHEREAS, the Monterey Regional Water Pollution Control Agency (MRWPCA) service area is subject to various earthquake-related hazards such as ground shaking, liquefaction, and tsunamis; and

WHEREAS, the MRWPCA service area is subject to various weather-related hazards including coastal storms, and floods; and

WHEREAS, the MRWPCA recognizes that disasters do not adhere to city, county, or special district boundaries; and

WHEREAS, the Monterey Regional Water Pollution Control Agency has a mission to reduce the vulnerability of MRWPCA and its member entities to the effects of natural hazards through the effective use of risk assessments, management approaches, and coordination with other State, regional, and local hazard management plans; and

WHEREAS, to accomplish this mission, the MRWPCA has set the following goals: identifying and profiling hazards (specifically coastal storms and erosion, expansive soils, earthquake, flood, and tsunami); assessing vulnerability; setting local hazard mitigation goals and strategy; and

WHEREAS, to realize these goals, the MRWPCA has surveyed existing data; utilized expertise from agency personnel; obtained participation from the public; and

WHEREAS, the federal Disaster Mitigation Act of 2000 requires all cities, counties, and special districts to have adopted a Local Hazard Mitigation Plan to receive disaster mitigation funding from the Federal Emergency Management Agency (FEMA); and

WHEREAS, the Monterey Regional Water Pollution Control Agency has written a Local Hazard Mitigation Plan; and

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Monterey Regional Water Pollution Control Agency, as follows:

1. Adopts the Monterey Regional Water Pollution Control Agency Local Hazard Mitigation Plan

2. Commits to continuing to take those actions and initiating further actions, as appropriate, as identified in the Monterey Regional Water Pollution Control Agency Local Hazard Mitigation Plan, including the future maintenance of the plan

PASSED AND ADOPTED by the Board of Directors of the Monterey Regional Water Pollution Control Agency at a Regular Meeting duly held on _____, by the following vote:

AYES:

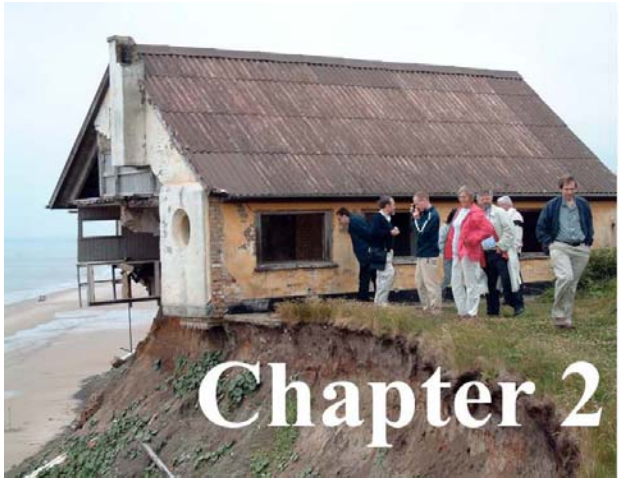
NOES:

ABSENT:

_____
Mayor David Pendergrass
Chair of the Board of Directors

ATTEST:

_____
Keith Israel
General Manager/Secretary to the Board



Executive Summary

Section A. Executive Summary

- Hazard Mitigation and the Local Hazard Mitigation Plan
- Hazard Mitigation Goals
- Hazard Mitigation Plan Development
- Plan Maintenance

Chapter 2. EXECUTIVE SUMMARY

Section A. Executive Summary

Section A. Executive Summary

Hazard Mitigation and the Local Hazard Mitigation Plan

Hazard mitigation is sustained action taken to reduce or eliminate the risk to life, property and the environment from natural and manmade hazards. The Local Hazard Mitigation Plan is a requirement of the Federal Emergency Management Agency (FEMA), which must be satisfied for jurisdictions to receive future mitigation funding before or after a disaster. The Disaster Mitigation Act of 2000 (DMA 2000) requirements were established so programs and projects will be created that will help minimize the loss of life, property, and the total cost of disasters.

Hazard Mitigation Goals

The Monterey Regional Water Pollution Control Agency has identified seven hazard mitigation goals:

1. Minimize loss of life and property from hazard events
2. Mitigate for disasters
3. Increase public education and awareness of hazards to MRWPCA facilities so that area residents can better anticipate and prepare for them
4. Assure that MRWPCA's essential facilities maintain operations during a disaster and afterward during recovery operations
5. Make MRWPCA facilities more resistant to earthquake hazard
6. Make MRWPCA transportation facilities less vulnerable to natural hazards
7. Prevent sewage spills to the greatest extent possible

Hazard Mitigation Plan Development

These hazard mitigation goals were developed based on hazard risk and vulnerability assessments. This document details the findings of the assessments and the process used to develop this mitigation strategy. This process was undertaken with the mission of the Monterey Regional Water Pollution Control Agency Local Hazard Mitigation Plan Committee in mind:

"To reduce the vulnerability of MRWPCA and its member entities to the effects of natural hazards through the effective use of risk assessments, management approaches, and coordination with other State, regional, and local hazard management plans."

Specifically, the LHMP planning process consisted of several elements: the utilization of the expertise of MRWPCA personnel from several different departments, the survey of existing data and research into the history of hazard events in the MRWPCA service area. The public was invited to participate in the planning process though the Agency's webite and at public meetings of the MRWPCA Board of Directors. The process was implemented by the MRWPCA LHMP Committee, which set out to: identify and profile natural hazards and to a lesser extent manmade hazards; assess vulnerability; set local hazard mitigation goals and strategy; and plan for future maintenance of the Local Hazard Mitigation Plan.

Based on locations, extents, previous occurrences, and probabilities of future events, the Agency's LHMP Committee determined that there are six natural hazards to which the City is vulnerable. These hazards are coastal storms, coastal erosion, earthquake, expansive soils, flood, and tsunami

The group explored the vulnerabilities of MRWPCA service area to these natural hazards by looking at the impacts each hazard would have on specific sections of the MRWPCA infrastructure.

Plan Maintenance

The Monterey Regional Water Pollution Control Agency Local Hazard Mitigation Plan is intended to be a dynamic document, which will be updated regularly under the guidance of the MRWPCA Local Hazard Mitigation Plan Committee. The Agency will strive to incorporate the Local Hazard Mitigation Plan into existing planning mechanisms within two years of the formal adoption of the plan by the Federal Emergency Management Agency (FEMA). Future updates of the plan, recommended by the Local Hazard Mitigation Plan Committee and adopted by the Board of Directors, will also be incorporated into existing plans. Any public comments received relative to the plan will be collected and will be included in reports to the Board. They will also be considered during future plan updates, with the goal of a major update being completed within 5 years of FEMA approval.

Chapter 3 Introduction

Section A. Overview of the Monterey Regional Water Pollution Control Agency (MRWPCA)

- The Monterey Regional Water Pollution Control Agency Mission and Goals

Section B. Introduction to the Hazard Mitigation Process

- Local Hazard Mitigation Planning for MRWPCA
- Local Hazard Mitigation Plan Mission Statement
- Review of Local Mitigation Requirements
- Adoption of the Local Hazard Mitigation Plan

Chapter 3. INTRODUCTION

Section A. Overview of the Monterey Regional Water Pollution Control Agency (MRWPCA)

The Monterey Regional Water Pollution Control Agency Mission and Goals

Section B. Introduction to the Hazard Mitigation Process

Local Hazard Mitigation Planning for MRWPCA

Local Hazard Mitigation Plan Mission Statement

Review of Local Mitigation Requirements

Adoption of the Local Hazard Mitigation Plan

Section A. Overview of the Monterey Regional Water Pollution Control Agency (MRWPCA)

The Monterey Regional Water Pollution Control Agency (MRWPCA) operates the regional wastewater treatment plant located two miles north of Marina. It also maintains ten pump stations connected to the treatment plant. The secondary treatment outfall pipe discharges 2.5 miles into Monterey Bay.

MRWPCA member communities are Pacific Grove, Monterey, Del Rey Oaks, Seaside, Sand City, Fort Ord, Marina, Castroville, Moss Landing. See the map of the agency's geographical area below, Exhibit 3-1.

Additionally, MRWPCA operates the water recycling facility at the Regional Treatment Plant (RTP) and manages the distribution system under contract from the Monterey County Water Resources Agency. Sixty percent of incoming effluent is recycled and paid for by Salinas Valley agricultural growers and property owners. The recycling operations provide irrigation water to 12,000 acres of Castroville farmland. Farmlands receiving recycled water are also shown on Exhibit 3-1.

The Monterey Regional Water Pollution Control Agency Mission and Goals

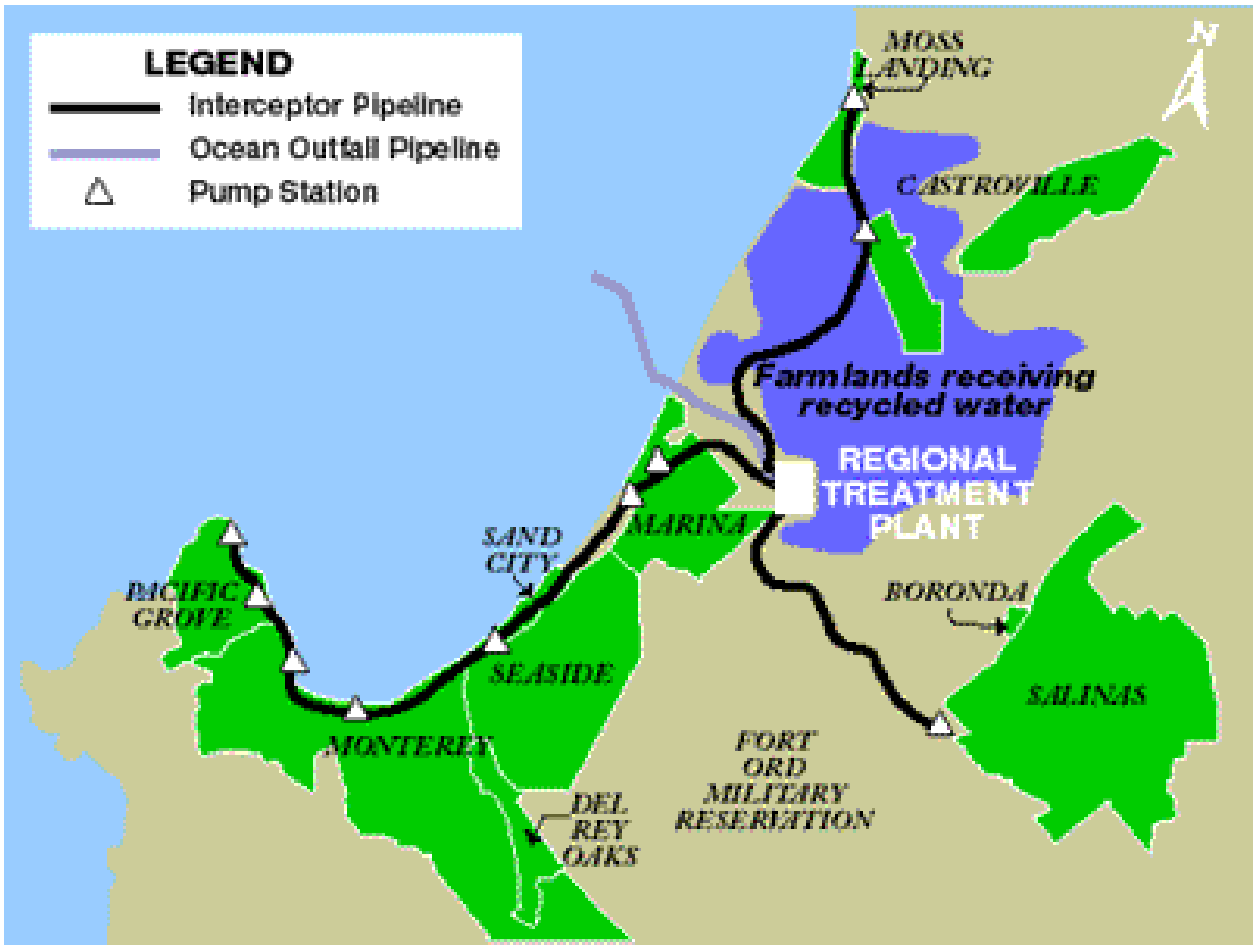
Mission Statement

The Monterey Regional Water Pollution Control Agency is dedicated to meeting the wastewater and reclamation needs of our member agencies while protecting the environment.

Vision Statement

The Monterey Regional Water Pollution Control Agency will be a model customer service provider for the efficient, innovative utilization of wastewater.

Exhibit 3-1, Monterey Regional Water Pollution Control Agency Geographical Area



Core Values

The Monterey Regional Water Pollution Control Agency values (not in priority order):

- Cost-efficient, consistent and reliable service and business practices
- Ethical behavior
- Customer-focused and centered
- Helpful and timely responses
- Loyalty and dedication

Three Year Goals

Goals for 2006-2008 (not in priority order):

- Expand The Salt Reduction Program
- Continue to Reduce Ocean Discharge
- Maintain and Improve the Human, Physical and Fiscal Assets for the Agency
- Develop and Begin to Implement a Plan to Provide Adequate Capacity for Member Entity Growth

Section B. Introduction to the Hazard Mitigation Process

Local Hazard Mitigation Planning for MRWPCA

The Disaster Mitigation Act of 2000 (DMA 2000) requires that each state develop a Hazard Mitigation Plan, in order to receive future mitigation funding before or after a disaster. Local jurisdictions and special districts are also required to develop their own plans so that they will be eligible for this funding. The DMA 2000 requirements were established so that programs and projects will be created that will help minimize the loss of life, property, and the total cost of disasters.

Section §201.6(c)(3) of the Disaster Mitigation Act of 2000 outlines the process for local agencies in developing their mitigation strategies. Specifically, the Local Hazard Mitigation Plan must "include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools." These strategies should be built on an assessment of hazard risks and vulnerabilities. The plans should include measures to mitigate hazard risks and demonstrate the benefit of these activities. They should also identify gaps in knowledge and data and a strategy to maintain and update the data, projects, information, and the overall mitigation plan. The next section of this chapter provides an overview of the requirements and identifies where these requirements have been met within this Local Hazard Mitigation Plan.

The MRWPCA has developed a hazard mitigation strategy based on hazard risk and vulnerability assessments. The agency undertook the multi-hazard risk and vulnerability assessment and mitigation strategy and prioritized these activities. This document details the findings of the assessments and the process used to develop this strategy.

Local Hazard Mitigation Plan Mission Statement

MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY (MRWPCA)
LOCAL HAZARD MITIGATION PLAN
MISSION STATEMENT

To reduce the vulnerability of MRWPCA and its member entities to the effects of natural hazards through the effective use of risk assessments, management approaches, and coordination with other State, regional, and local hazard management plans.

Then we can develop a corresponding list of Goals that would include:

Perform a hazard risk assessment that encompasses all of MRWPCA's facilities

Prepare a floodplain management plan
(This is complete)
Perform a seismic retrofitting assessment, and carry out its recommendations
(This is complete)
Coordinate on an ongoing basis with State, regional, and local planning activities pertaining to risks from natural hazards

Apply for grants under hazard mitigation grant programs
to assist with funding of these activities

Review of Local Mitigation Plan Requirements

Requirement §209.6(c)(5)

The Local Hazard Mitigation Plan shall include "documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g. City Council. County Commissioner. Tribal Council)..."

The Board of Directors of the MRWPCA adopted resolution ******* on *******. This resolution sets up a comprehensive mitigation program to address natural hazards. It not only adopts the current mitigation plan, but also establishes guidelines and programs to maintain the plan. It further designates that the MRWPCA Local Hazard Mitigation Plan Committee will manage the hazard mitigation program.

IFR Requirement §209.6(c)(1)

The plan must document "the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved."

Chapter 4 of this document describes the planning process used, the methods for the risk and vulnerability assessment, how the public was involved. The draft LHMP strategy was publicized for about a month to encourage public comment, and was posted on the agency's website (www.mrwpca.org). The plan was presented to the MRWPCA Board of Directors for review at a regular meeting. All Board of Directors meetings are open to the public and the public was encouraged to comment on the plan. The MRWPCA main office also had several copies, including an unbound document that could be photocopied upon request. Members of the MRWPCA Local Hazard Mitigation Plan Committee were invited to review and comment on specific sections, to comment on the draft plan, and to distribute the information through their various networks to encourage review.

Requirement §201.6(c)(2)(i)

The risk assessment shall include a "description of the type ... of all natural hazards that can affect the jurisdiction...

Chapter 5 identifies natural hazards that can affect the MRWPCA service area. As described in Chapter 5, the hazards that have been identified are based on input from the Local Hazard Mitigation Plan Committee and input from the public. Chapter 5 focuses on six natural hazards in the agency's service area and provides descriptions of these hazards as they affect the agency. Two manmade hazards are analyzed in less detail.

Requirement §201.6(c)(2)(i)

The risk assessment shall include a "description of the ... location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events."

Chapter 5 contains historical occurrences of the natural hazards, along with maps showing the areas that are most at risk from several different types of geologic hazards. MRWPCA service area maps for earthquake, liquefaction, flooding, tsunami and wildfire can be found in Chapter 5.

Requirement §201.6(c)(2) (ii)(A)

The risk assessment shall include a "description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. The plan should describe vulnerability in terms of: The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas . . ."

Chapter 5, Section B, describes the vulnerability of hazards and impacts on the MRWPCA service area. The tables and maps show how assets (people, buildings, critical facilities and infrastructure) are vulnerable to and would be impacted (as an estimated percentage) by hazards.

Requirement §201.6(c)(2) (ii)(B)

The plan should describe vulnerability in terms of an "estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate . . ."

Chapter 5, Section B, describes impacts to MRWPCA facilities in terms of estimated percentages impacted. Vulnerability in terms of potential dollar losses to infrastructure will be included in future updates of the LHMP, as these data become available.

Requirement §201.6(c)(3) (i)

The hazard mitigation strategy shall include: a "description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Chapter 6 describes the mitigation goals and objectives determined by the Local Hazard Mitigation Plan Committee.

Requirement §201.6(c)(3) (ii)

The mitigation strategy shall include a "section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Chapter 6 identifies mitigation actions, policies, and projects that have been in place to reduce hazards. It further identifies projects prioritized to address some of the most critical needs for mitigation.

Requirement §201.6(c)(3) (iii)

The mitigation strategy section shall include "an action plan describing how the actions identified in section (c)(3)(ii) shall be prioritized, implemented. and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Chapter 6 describes mitigation actions and how they were prioritized. The chapter describes the plan for implementation of these actions. Costs and benefit were important factor in the prioritization of mitigation actions, though costs were analyzed on a qualitative basis only. As more detailed information becomes available, more accurate cost-benefit ratios will be developed for mitigation projects and will be included in future updates of the LHMP. Many of the identified actions include support for policies and activities that could be implemented through existing programs and daily operations by the agency.

Requirement §201.6(c)(4)(i)

The plan maintenance process shall include a section describing the "method and schedule of monitoring, evaluating and updating the mitigation plan within a five-year cycle.

Chapter 7 describes the plan maintenance process, including the schedule for monitoring, evaluating, and updating the mitigation plan within the five-year cycle.

Requirement §201.6(c)(4) (ii)

The plan shall include a "process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate...

Several MRWPCA documents include suggested mitigation measures for the impacts of natural and man-made hazards. The MRWPCA Business Response Plan gives mitigation measures for natural and man-man hazards. In addition, the Seismic Vulnerability Evaluation, Wastewater Collection System, Monterey Regional Water Pollution Control Agency, the Review of Potential Damage to Force Mains at 10 Pump Stations due to Long-Term Settlement for the Monterey Regional Water Pollution Control Agency; and the Enhanced Spill Prevention Plan include suggested mitigation for earthquake, settlement and spills. The Local Hazard Mitigation Plan includes input from the above documents and formalizes mitigation strategies. After the agency officially adopts the Local Hazard Mitigation Plan, it will become the official planning document for hazard mitigation strategies.

Requirement §201.6(c)(4) (iii)

The plan maintenance process shall include a "discussion on how the community will continue public participation in the plan maintenance process.

The plan will be available at the MRWPCA main office. Comments and suggestions will be collected for review and consideration by the MRWPCA Local Hazard Mitigation Plan Committee.

Also, copies of the plan and any proposed changes will be posted on the MRWPCA website, www.mrwpca.org. Chapter 4 of the Local Hazard Mitigation Plan contains an email address and phone number to which people can direct their comments, concerns or qustions.

Comments on the LHMP will be taken at future meetings of the MRWPCA Board of Directors, where the public is welcome and encouraged to provide their input. At that time, the Board of Directors and the LHMP Committee will gather comments from the larger community to ensure that the plan continues to implement mechanisms to reduce hazards throughout the county.

Adoption of the Local Hazard Mitigation Plan by the Local Governing Body

To meet the requirements of DMA 2000, the MRWPCA has formally adopted this document, as indicated by the Resolution of the Board of Directors of the MRWPCA in Chapter 1.

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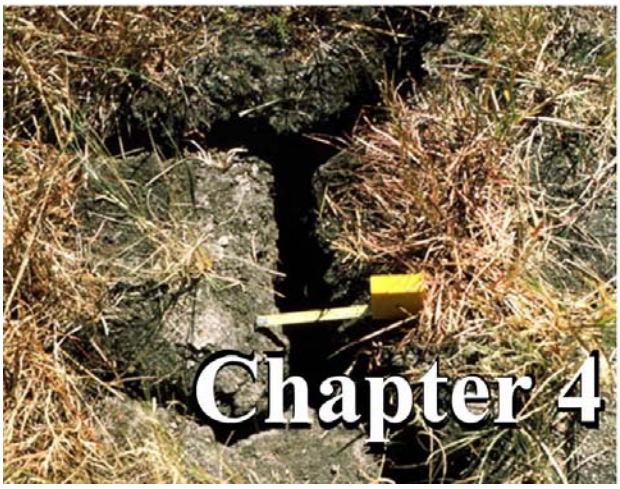

Chapter 4 Planning Process

Section A. Documentation of the Planning Process

- The Planning Process
- MRWPCA LHMP Planning Committee
- Public Involvement
- Involvement of Outside Agencies
- Review and Incorporation of Appropriate Existing Plans, Studies, Reports and Technical Information
- Appendices

Chapter 4. PLANNING PROCESS

Section A. Documentation of the Planning Process

Section A. Documentation of the Planning Process

The Planning Process

The Local Hazard Mitigation Plan planning process consisted of several elements: the utilization of the expertise of personnel from different MRWPCA departments; the survey of existing data; and public participation. The process was implemented by the MRWPCA LHMP Committee, which undertook this process with the following goals in mind: identifying and profiling hazards; assessing vulnerability; setting local hazard mitigation goals and strategy; and planning for future maintenance of the LHMP.

MRWPCA LHMP Planning Committee

The core planning team is the MRWPCA LHMP Committee, which is composed of representatives of various agency departments. The members of the committee are as follows:

Jim Heitzman, Assistant General Manager
John Tiernan, Director of Administrative Services
Maria C. Sandoval, Safety Officer
Bret Boatman, Lead Field Maintenance

The committee developed a draft plan, in conjunction with local utilities and other experts. See Appendix 4-1, The Planning Process - List of Activities. Also public input was gathered as described below.

Public Involvement

The plan was presented to the MRWPCA Board of Directors for review at a regular meeting. All Board of Directors meetings are open to the public and the public was encouraged to comment on the plan. A survey of local residents on hazard mitigation goals and objectives was circulated via agency's web site and buildings. (Appendix 4-2, Questionnaire). The draft LHMP strategy was publicized for about a month to encourage public comment, and was posted on the agency's website (www.mrwpca.org). The MRWPCA main office also had several copies, including an unbound document that could be photocopied upon request. Members of the MRWPCA Local Hazard Mitigation Plan Committee were invited to review and comment on specific sections, to comment on the draft plan, and to distribute the information through their various networks to encourage review.

Involvement of Outside Agencies

Outside agencies were welcome to participate in the planning process through the posting of LHMP drafts on the agency's website and at MRWPCA Board meetings. (See Appendix 4-3, Stakeholders list).

Review and Incorporation of Appropriate Existing Plans, Studies, Reports and Technical Information. (Appendix 4-4, List of References).

MRWPCA has already done extensive investigation into the safety of their facilitates. Several reports have been completed documenting these investigations. The following plans were reviewed during the LHMP process: MRWPCA Business Response Plan; Seismic Vulnerability Evaluation, Wastewater Collection System, Monterey Regional Water Pollution Control Agency; Review of Potential Damage to Force Mains at 10 Pump Stations due to Long-Term Settlement for the Monterey Regional Water Pollution Control Agency; and a the Enhanced Spill Prevention Plan.

Business Response Plan
By the Monterey Regional Water Pollution Control Agency
August 2004

MRWPCA has procedures already in place for emergency response, including personnel training, the use of personal protective equipment, and response to major accidents involving injuries. Mitigation measures are already in place for: fire at the Monterey Regional Wastewater Treatment Plant (including threats posed by hazardous materials spills or explosions); earthquake at the facility; hazardous materials incidents, which could be caused by a natural hazard such as earthquake; power outage, which could be the result of an earthquake; or explosion. The Business Response Plan also outlines response to the manmade hazard of a bomb threat. These procedures are incorporated in the Local Hazard Mitigation Plan as appropriate.

Seismic Vulnerability Evaluation Wastewater Collection System Monterey Regional Water Pollution Control Agency Monterey, California
By Dames and Moore
August 19, 1998

The study concluded that life safety risk due to earthquake damage is low for the Wastewater Collection System (WCS). However, seismic upgrades to improve seismic performance and reduce losses and exposure should be considered. In the development of the LHMP, MRWPCA evaluated the benefits and costs of major soils and structural improvements to their facilities. Specific recommendations, which are designed to prevent or significantly limit damage, include: the implementation of a field exploration program to better quantify the fault-crossing hazard along the King City, Tularcitos-Navy and Chupines faults; the completion of structural analyses of the most critical pump stations; and the completion of geotechnical investigations and consideration of replacement alternatives and joint strengthening for selected portions of the interceptors. Appropriate recommendations have been incorporated into the LHMP.

Review of Potential Damage to Force Mains at 10 Pump Stations due to Long-Term Settlement for Monterey Regional Water Pollution Control Agency
By MMI Engineering
March 28, 2003

This study was done to reduce risk of potential sewage spills that result from non-seismic issues. Specifically, the potential for damage to sewer force mains from long-term settlement of underlying soil was assessed. This assessment was done because a system vulnerability study completed in 1998 had identified the potential for sewage spillage because force main piping may not have adequate flexibility to accommodate settlement or movement of soil below the pipe. The current study concluded that the probability of a force main rupturing from the settlement of backfill during static (non-seismic) conditions was very low. In fact, it was determined that the disruption in service and cost associated with pump station upgrades were not warranted. Therefore, this problem will not be addressed in the LHMP.

Enhanced Spill Prevention Plan Submitted to Monterey Regional Water Pollution Control Agency
By CH2MHill in coordination with ADA Applied Decion Analysis, Inc.
April 18, 1997

Primary recommendations of this study to prevent sewage spills were to: 1) complete a review of the electrical control systems for the major pump stations to determine if there are enough independent operations between each of the control systems to ensure that failure of a single system or component cannot disable the entire station; 2) perform a feasibility study to determine if the use of supplemental containment is warranted, especially at pump stations where there are short detention times or sensitive environmental resources nearby, and where land is available; 3) update long-range plans for replacement or upgrade of key equipment and

systems at MRWPCA facilities (update should include an assessment of future demands on the system, the expected life and performance of equipment, the possibility of technical obsolescence, and the availability of parts); and 4) conduct a seismic vulnerability assessment of all pump stations and to identify areas of possible liquefaction that could impact MRWPCA pipelines. These recommendations have been evaluated and incorporated into the LHMP as appropriate.

Transportation Vulnerabilities Study, Monterey Regional Water Pollution Control Agency
G.S. Dodson & Associates, Consulting Engineers
July 17, 1998

This review of the existing transport system was done with the goal of reducing or preventing future spills. Recommendations include: 1) The Agency should retain an independent corrosion specialist to assess the condition of external corrosion on the Agency's transport system and to develop a long-term program for the maintenance of the corrosion protection system; 2) The useful life of the wastewater transport system forcemains can be extended beyond 100 years with proper corrosion protection; 3) The Agency's gravity interceptors should be televised to identify structural and joint problems and to verify the condition of the protective linings; and 4) Flexibility should be provided for the discharge forcemain at all pumping station structures. Prioritized Corrective Actions are as follows: Over the next two years, the Agency should retain corrosion specialist to assess District transport system and televise all gravity sewers. Over the next five years, the Agency should provide flexibility at the forcemain discharge from pumping stations and inspect all buried manholes and structures for damage to ferrous metals, liners, and coatings. These recommendations have been evaluated and incorporated into the LHMP as appropriate.

List of Appendices

4-1 MRWPCA Local Hazard Mitigation Plan List of Planning Activities

4-2 MRWPCA Local Hazard Mitigation Plan Questionnaire

4-3 Stakeholders List

4-4 List of References

Appendix

4-1 MRWPCA Local Hazard Mitigation Plan List of Planning Activities

Date	Activity
Annually	Business response Plan Training for all employees
01/13/2005	OACC meeting attended by Safety Officer, who is a member of the Council
03/21/2005	Meeting of LHMP Committee
06/08/2005	Meeting of LHMP Committee
07/08/2005	OACC meeting attending by Safety Officer, who is a member of the Council
10/03/2005	Meeting of LHMP Committee
10/14/2005	OACC Meeting Attended by Safety Officer, who is a member of the Council
11/05/2005	CERT Training for 2 Field Maintenance Lead personnel
11/12/2005	CERT Training for 2 Field Maintenance Lead personnel
11/16/2005	CERT Training for 2 Field Maintenance Lead personnel
11/16/2005	Tsunami Incident Planning Group Meeting attended by Safety Officer
11/05	Draft LHMP presented to MRWPCA Board of Directors
11/05-1/06	Public Comment Period
01/06	Public Meeting
01/06	LHMP adopted by the MRWPCA Board of Directors
01/06	Technical Advisory Committee

Abbreviations:

CERT	Community Emergency Response Training
LHMP	Local Hazard Mitigation Plan
OACC	Operational Area Coordinating Council

Appendix 4-2 MRWPCA Local Hazard Mitigation Plan Questionnaire

Monterey Regional Water Pollution Control Agency

Local Hazard Mitigation Plan Questionnaire

2005

The Monterey Regional Water Pollution Control Agency (MRWPCA) is developing a Local Hazard Mitigation Plan to reduce the vulnerability of MRWPCA and its member entities to the effects of natural hazards.

This questionnaire is designed to help us understand your experience with natural disasters, the dissemination of information about these hazards and your preparedness for disasters. A plan is being developed to prioritize activities to assist those in the MRWPCA service area reduce their risk from natural disasters.

Your returned survey indicates your willingness to take part in the study. Your participation in this study is voluntary. All individual survey responses are strictly confidential, and are for research purposes only.

Your opinions are important to us. If you have questions regarding the survey, feel free to contact Maria C. Sandoval, Safety Officer, at 831-883-6112.

Thank you for your participation!

Individual or Organization (Circle One)	**Individual** **Organization**
Name (optional)	
Telephone Number (optional)	
Date Completed	
Directions:	Please complete the survey and **return it by Friday, January 6, 2006**. You may drop it off, mail it or fax it. **Drop Off Points**: Regional Treatment Plant at 14201 Del Monte Blvd., Marina or the Administrative Office at 5 Harris Court, Building D, Monterey **Mailing Address:** 5 Harris Court, Building D, Monterey, Attention: Maria C. Sandoval, Safety Officer **Fax Number:** (831) 883-0516
Questions:	Maria C. Sandoval, Safety Officer Telephone: (831) 883-6112 Email: maria@mrwpca.com
www.mrwpca.org	

Monterey Regional Water Pollution Control Agency
Local Hazard Mitigation Plan Questionnaire 2005

NATURAL HAZARD INFORMATION

1. In the past 5 years, have you or someone in your household experienced a natural disaster such as an earthquake, flood, wildfire or other type of natural disaster?

Yes ☐ No ☐

If "NO" Skip to Question 2

If "YES", which of these natural disasters have you or someone in your household experienced? Please check all that apply

Coastal Storm	
Drought	
Earthquake	
Flood	
Landslide	
Tsunami	
Wildfire	
Other (specify)	

2. How concerned are you about the following hazards:

Hazard	Very Concerned	Concerned	Somewhat Concerned	Not Concerned
Coastal Erosion				
Coastal Storm				
Drought				
Earthquake				
Expansive Soils				
Flood				
Land Subsidence				
Landslide				
Tsunami				
Wildfire				

Bomb Threat				
Hazardous Materials				
Public Utility Disruption				
Other hazards that you believe the community should plan for:				

3. Have you ever received information about how to make your family and home safer from natural hazards?

Yes ☐ No ☐

If "NO" Skip to Question 5

If "YES", how recently?

Within the last 6 months	
Between 6 and 12 months	
Between 1 and 2 years	
Between 2 and 5 years	
5 years or more	

4. From whom did you last receive information about how to make your family and home safer from natural disasters? Please check only one:

News media	
Government agency	
Insurance agent or company	
Utility company	
American Red Cross	
Other non-profit organization	
Not sure	
Other (please specify):	

5. Who would you most trust to provide you with information about how to make your family and home safer from natural disasters? (Please check all that apply)

Newspapers:

Newspaper stories	
Newspaper ads	

Television:

Television news	
Television ads	

Radio:

Radio news	
Radio ads	

Other methods:

Schools	
Outdoor ads (billboards, etc.)	
Books	

Other methods (continued):

Mail	
Fire Department/Rescue	
Internet	
Fact sheet / brochure	
Chamber of Commerce	
Public workshop / meetings	
Magazine	
Academic Institutions	
Other (please explain):	

6. To assist in communicating information to Monterey County residents about how to better prepare for a natural disaster, which of the following phrases do you think is the easiest to understand?

Natural disaster readiness	
Disaster preparedness	
Emergency preparedness	
Natural hazard risk reduction	
Other (please explain):	

Monterey Water Pollution Control Agency
Local Hazard Mitigation Plan Questionnaire 2005

LOCAL CAPABILITIES ASSESSMENT

7. In the following list of activities, check the box that applies to you. (Please check one answer for each preparedness activity). This information will be used to level of disaster preparedness in the MRWPCA service area.

	Have Done	**Plan to Do**	**Not Done**	**Unable to Do**
Acquired information on disaster preparedness?				
Talked with members in your household / organization about what to do in case of a disaster?				
Developed a "Family/Organization Emergency Plan" to decide what everyone would do in the event of a disaster?				
Prepared a "Disaster Supply Kit" (Stored extra food, batteries, water, or other emergency supplies)?				
Been trained in First Aid?				
Completed Community Emergency Response Team (CERT) training?				
Other issues regarding community disaster response capabilities that you believe are important:				

Appendix 4-3

Stakeholders List

First Name	Last Name	City
Doug	Quetin	Air Pollution Control Office – MBUAPCB
Nick	Papadakis	AMBAG
Ramiro	Cortez	Boronda County Sanitation
Carlo	Cortopassi	County Service Area (14) Castroville
Dewey	Baird	Defense Language Institute
Ron	Langford	Del Rey Oaks, City of
		Division of Environmental Health
Nick	Chiulos	Env Res Plcy
Kate	McKenna	LAFCO
Rob	Wellington	Law Offices
E.	Gomez	Marina Public Works Department
Christi	Di'Iorio	Marina, City of
Holly	Price	MBNMS
		MBUAPCD
Mike	Armstrong	MCWD
Mary Ann	Dennis	Monterey County Health Department
Dale	Ellis	Monterey County Planning Department
Reggie	Lee	Monterey County Planning Department
Ed	Muniz	Monterey County Public Works Department
Ron	Lundquist	Monterey County Public Works Department
Bill	Wojtkowski	Monterey, City of
Peggy	Shirrel	Moss Landing Sanitation District
David	Berger	MPWMD
Steve	Leiker	Pacific Grove Public Works Department
Jon	Biggs	Pacific Grove, City of
Tom	Reeves	Public Works Department
Roger	Briggs	RWQCB
Carl	Niizawa	Salinas, City of
Rob	Russell	Salinas, City of
Kelly	Morgan	Sand City, City of
Steve	Matarazzo	Sand City, City of
Diana	Ingersoll	Seaside Public Works Department
Lou	Dell'Angela	Seaside, City of

Appendix 4-4 List of References

California State Department of Water Resources, Drought Preparedness Section, National Drought Mitigation Center, www.water.ca.gov and www.drought.unl.edu/whatis/what.htm
These websites contain information on the history of droughts in California and drought definitions.

Enhanced Spill Prevention Plan submitted to the Monterey Regional Water Pollution Control Agency, prepared by CH2MHill, in coordination with ADA Applied Decision Analysis, Inc., April 18, 1997
This study to prevent sewage spills contains recommendations, including: a review of the electrical control systems for the major pump stations; a feasibility study to determine if the use of supplemental containment is warranted; update of long-range plans for replacement or upgrade of key equipment and systems at MRWPCA facilities; and a seismic vulnerability and liquefaction assessment of all pump stations.

Seismic Vulnerability Evaluation Wastewater Collection System, Monterey Regional Water Pollution Control Agency, Monterey, California, by Dames and Moore, August 19, 1998
The study concluded that life safety risk due to earthquake damage is low for the Wastewater Collection System (WCS). However, seismic upgrades to improve seismic performance and reduce losses and exposure should be considered.

Transportation Vulnerabilities Study, Monterey Regional Water Pollution Control Agency by G.S. Dodson and Associates, Consulting Engineers, July 1998
This review of the existing transport system was done with the goal of reducing or preventing future spills. Recommendations include: the retention of an independent corrosion specialist to assess the condition of external corrosion and to develop a long-term program for corrosion protection system maintenance; corrosion protection to extend the useful life of the wastewater transport system forcemains; televising of gravity interceptors to identify structural and joint problems; and flexibility for the discharge forcemain at all pumping station structures. The study also lists prioritized corrective actions.

State and Local Mitigation Planning, How-To Guide: Getting Started – Building Support for Mitigation Planning, September 2002, FEMA 386-1. The "How-To" Guides were developed by the Federal Emergency Management Agency (FEMA) to assist jurisdictions in the writing and implementation of their local hazard mitigation plans. They provide information needed to initiate and maintain a planning process that will result in safer communities.

State and Local Mitigation Planning, How-To Guide: Understanding Your Risks, Identifying Hazards and Estimating Losses, by the Federal Emergency Management Agency (FEMA), August 2001, FEMA 386-2

State and Local Mitigation Planning, How-To Guide: Developing the Mitigation Plan, Identifying Mitigation Actions and Implementation Strategies, by the Federal Emergency Management Agency (FEMA), April 2003, FEMA 386-3

State and Local Mitigation Planning, How-To Guide: Bringing the Plan to Life, Implementing the Hazard Mitigation Plan, by the Federal Emergency Management Agency (FEMA), August 2003, FEMA 386-4

State and Local Mitigation Planning, How-To Guide: Integrating Manmade Hazards into Mitigation Planning, by the Federal Emergency Management Agency (FEMA), September 2003, FEMA 386-7

www.gamma-rs.ch, Gamma Remote Sensing, This website contains information on land subsidence

Foundations in Problem Soils, Steven J. Greenfield and C.K. Shen, 1992
This book provides information on soil mechanics and foundation systems. Expansive soils, and other problem soils are discussed.

Understanding '100-year flood' by Carol Kimbrell,
www.lcra.org/featurestory/2003/2003_3_25_flood_sidebar.html)
This website provides general information on 100-year floods.

Review of Potential Damage to Force Mains at 10 Pump Stations due to Long-Term Settlement for Monterey Regional Water Pollution Control Agency, Monterey, California, by MMI Engineering, Inc., March 28, 2003
This study was done to reduce risk of potential sewerage spills that result from non-seismic issues. Specifically, the potential for damage to sewer force mains from long-term settlement of underlying soil was assessed. The study concluded that the probability of a force main rupturing from the settlement of backfill during static (non-seismic) conditions was very low.

Winter Storm, County of Monterey Office of Emergency Services,
www.co.monterey.ca.us/oes/winterstorm.htm
This website contains general information on winter storms and mitigation for them.

Tsunamis, County of Monterey Office of Emergency Services,
www.co.monterey.ca.us/oes/tsunamis.htm
This website provides information on tsunamis, including definitions, their history, and mitigation.

Probability of Earthquake Shaking Intensity, Monterey County Office of Emergency Services, Information Technology GIS Team
This map shows earthquake shaking intensities for the MRWPCA service area.

Flood Zones, Monterey County Office of Emergency Services, Information Technology GIS Team, This map This map shows flood zones for the MRWPCA service area.

Tsunami Evacuation Areas, Monterey County Office of Emergency Services, Information Technology GIS Team This map shows estimated tsunami run-up areas for 5-, 10- and 15- meter waves for the MRWPCA service area.

Wildland Fire Threat Categories Map, Monterey County Office of Emergency Services, Monterey Regional Water Pollution Control Agency, prepared by the Office of Emergency Services
This map shows wildland fire threat areas for the MRWPCA service area.

Business Response Plan by the Monterey Regional Water Pollution Control Agency, August 2004
The business response plan contains procedures for emergency response, including personnel training, the use of personal protective equipment, and response to major accidents involving injuries. It also includes mitigation measures for fire and hazardous materials incidents, power outage, and explosions. It also outlines response to the manmade hazard of a bomb threat.

Expanded Water Conservation and Standby Rationing Plan, by the Monterey Peninsula Water Management District and the California- American Water Company
conserve@mpwmd.dst.ca.us and monterey@calamwater.com
This paper explains the water conservation and rationing plan for the Monterey Peninsula. It is in response to periodic weather-related droughts that occur after consecutive years of low rainfall and conditions imposed by the State Water Resources Control Board. This document describes the program to mitigation for water supply shortages. It outlines Stages 1 and 2 (voluntary) conservation measures, along with Stages 3 (water rates increase with increased water use), Stage 4 (15% rationing water reduction), and Stage 5 (mandatory 20% reduction in water use). Stages 6 and 7 (for severe long-term drought) are also described.

Tsunami Hazard Mitigation, A Report to the Senate Appropriations Committee, prepared by the National Oceanic and Atmospheric Administration Pacific Marine Environmental Laboratory, National Oceanic and Atmospheric Administration, March 31, 1995 (www.pmel.noaa.gov)
This report covers the threat the west coast communities from destructive tsunamis generated by earthquakes in the Cascadia Subduction Zone. It identifies at-risk communities, inventories existing national resources, reviews recent technological advances and develops specific, practical recommendations. It also outlines the Tsunami Hazard Mitigation Plan, which is designed to modernize and integrate existing national capabilities by exploiting recent technological advances.

City of Seaside Emergency Operation Plan, Draft Working Copy, Revision 1.1.0 June 2004
This document describes the mitigation, preparedness, response and recovery plans for the City of Seaside, designed to help develop a comprehensive and fully functional emergency operations program. It also includes historical information on hazards in the Monterey Bay area.

Earthquake Glossary, USGS Earthquake Hazards Program, United States Department of the Interior, United States Geological Survey (USGS)
This is a listing of definitions of earthquake terms.

Chapter 1 http://landslides.usgs.gov, United States Department of the Interior, United States Geological Survey (USGS)

This website gives descriptions of different types of landslides and their history.

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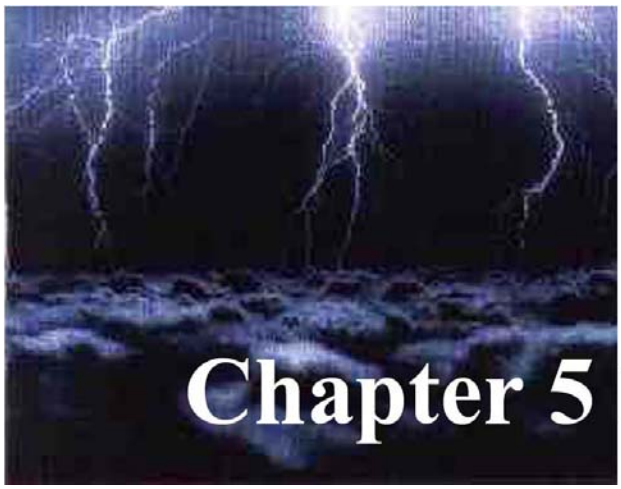

Chapter 5 Risk Assessment

Section A. Identifying and Profiling Hazards

- Identification of Natural and Manmade Hazards
- Description of Locations, Extents, Previous Occurrences and Probability of Future Events for Hazards

Section B. Assessing Vulnerability

- Overall Summary of Vulnerabilities
- Methodology for Determining the Impact of Hazards
- Area Descriptions and Types of Assets at Risk for Each Area
- Extent of Impacts
- Figures
- Appendix

Chapter 5 – RISK ASSESSMENT

Section A. Identifying and Profiling Hazards

Identification of Natural and Manmade Hazards

The MRWPCA Local Hazard Mitigation Plan Committee has completed a review of a comprehensive listing of natural hazards (See Figure 5-1, Profiling Hazards Checklist). After analyzing historical data and utilizing the expertise of the group, the following natural hazards were identified as those which could affect MRWPCA facilities: Coastal Erosion; Coastal Storm; Drought; Earthquake; Expansive Soils; Flood; Land Subsidence; Landslide; Tsunami; and Wildfire. In addition, the group has done a less rigorous review of the Bomb Threat and Hazardous Material Incidents manmade hazards. Following are descriptions of these hazards, along with the locations, extents, previous occurrences, and probabilities of future events.

Description of Locations, Extents, Previous Occurrences and Probability of Future Events for Hazards

NATURAL HAZARDS

Coastal Storm and Coastal Erosion

- County of Monterey Office of Emergency Services, Winter Storm, www.co.monterey.ca.us/oes/winterstorm.htm
- City of Seaside Emergency Operation Plan, Draft Working Copy Revision 1.1.0 June 2004

Intense storms often produce abnormally high waves and an elevated sea level, causing extensive beach erosion and shoreline retreat. The worst erosion generally occurs when multiple storms hit during periods of especially high tides. Several years may pass between storms intense enough to cause shoreline erosion that results in significant damage. Although waves rebuild beaches after such storms, this seaward accretion may not return a beach to its pre-storm position. Powerful coastal storms can cause severe damage to coastal areas.

During the winters of 1982-83 and 1997-98, two of the most severe El Niños of the 20th century produced intense storms that pounded the Central Coast. These storms followed more southerly tracks than usual and combined with periods of high tides to intensify the normal winter erosion cycle, causing tens of millions of dollars in damage along the central California coast. On Monterey Bay, coastal cliffs, dunes, and manmade structures suffered serious damage.

The extent of beach erosion or accretion is measured by landward or seaward shifts in the position of the shoreline at mean sea level (MSL). Storm waves during the 1982-83 El Niño stripped significant volumes of sand from Monterey Bay beaches, leaving dunes exposed to direct wave attack. By the end of the 1982-83 El Niño storms, Monterey Bay beaches were distinctly narrower than before.

During the 1997-98 El Niño, several intense winter storms from the south struck the Monterey Bay coastline. For two years, through September 1997, all but two Monterey Bay beaches remained stable except for normal seasonal fluctuations. However, beach erosion along the bay was less than in the 1982-83 El Niño.

Several of MRWPCA's pump stations are near the ocean and are susceptible to coastal storms and erosion. In fact, the Agency's greatest concern is that their pump stations could be inundated by a heavy storm or by a tsunami. They have an emergency response plan in place, which includes the use of generator power.

Because of the history of coastal storms and erosion, there is a high probability of these natural hazards occurring in the future. This LHMP will explore mitigation measures for coastal storms and erosion.

Drought

- Department of Water Resources, Drought Preparedness Section, (www.water.ca.gov)
- National Drought Mitigation Center http://www.drought.unl.edu/whatis/what.htm
- California- American Water Company
- Monterey Peninsula Water Management District

Drought originates from a deficiency of precipitation over an extended period of time, resulting in a water shortage. One dry year does not normally constitute a drought in California. Drought is a gradual phenomenon. In fact, droughts occur slowly, over a period of several years and there is no universal definition of when a drought begins or ends. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline.

The State of California has a long history of droughts. Droughts exceeding three years are relatively rare in Northern California, which is the source of much of the State's developed water supply. The driest single year of California's measured hydrologic record was 1977. California's most recent multi-year drought was 1987-92. Measured hydrologic data for droughts prior to 1900 are minimal. Multi-year dry periods in the second half of the 19th century can be qualitatively identified from the limited records available combined with historical accounts, but the severity of the dry periods cannot be directly quantified. The historical record of California hydrology is brief in comparison to geologically modern climatic conditions. In fact, investigations into historical records indicate that California has been subject to droughts more severe and more prolonged than those witnessed in the brief historical record, going as far back as 11,000 years.

Although droughts are sometimes characterized as emergencies, they differ from typical emergency events since they develop over a long period of time. Droughts affect everyone within the MRWPCA service area. Given the long history of droughts in the State of California, the probability of a drought occurring in the future is high. The Monterey Peninsula Water Management District, in cooperation with California-American Water Company also have a drought mitigation plan in place. While droughts do not adversely affect the MRWPCA's facilities, MRWPCA actually has programs in place to mitigate for drought which benefit all within the service area.

MRWPCA's innovative program to recycle wastewater has reduced the draw from local aquifers, which helps to secure the region's water supply and support local agriculture. As mentioned in the introduction, Chapter 3, MRWPCA recycles sixty percent of incoming effluent, which is used to irrigate farmland and golf courses. In fact, according to Agency officials, MRWPCA operates the world's largest water recycling facility designed for raw food crop irrigation.

The primary source for water in Monterey County is from aquifers hundreds of feet underground. The reserve is diminishing as the number of farms, businesses and residences have increased. In fact, so much water has been removed that intruding seawater has come to within two miles of Salinas's wells. In addition to threatening the drinking water supply, seawater intrusion threatens the region's multi-billion dollar agricultural economy.

In 1992, MRWPCA and the Monterey County Water Resources Agency formed a partnership to build two projects: a water recycling facility at the Regional Treatment Plant; and a distribution system including 45 miles of pipeline and 22 supplemental wells. Its objective was to retard the advance of seawater intrusion by supplying irrigation water to nearly 12,000 acres of farmland in the northern Salinas Valley. This significantly reduces the draw of water from the underground aquifers. The $75 million projects were completed in 1997.

The use of highly treated wastewater to irrigate landscaping has been practiced for years, yet for food crops, it is relatively new. The recycled water facility is capable of producing an average of 29.6 million gallons of recycled water per day. This is the equivalent of one foot of water over 91 acres of land. In the future, MRWPCA plans to additionally supply recycled water to city parks and roadway landscape.

Earthquake

- Earthquake Glossary, USGS Earthquake Hazards Program, United States Department of the Interior, United States Geological Survey (USGS)
- Understanding Earthquake Hazards in the San Francisco Bay Region, USGS (http:// pubs.usgs.gov/fs/2003/fs039-03/fs039-03.pdf)
- Seismic Vulnerability Evaluation Wastewater Collection System, Monterey Regional Water Pollution Control Agency, Monterey, California, was completed in 1998 by Dames and Moore
- Enhanced Spill Prevention Plan submitted to the Monterey Regional Water Pollution Control Agency, prepared by CH2MHill, April 18, 199l

An earthquake is a sudden motion or trembling in the earth caused by the abrupt release of slowly accumulated strain by volcanic activity or by faulting (movement which produces relative displacement of adjacent rock masses along a fracture). This energy

comes from stresses built up during interaction between the earth's crust and the interior of the earth.

The *Seismic Vulnerability Evaluation Wastewater Collection System, Monterey Regional Water Pollution Control Agency, Monterey, California,* was completed in 1998 by Dames and Moore. Local geology, seismic setting and historic seismicity were evaluated, and an inspection and structural audit of MRWPCA facilities was completed (including pump station buildings, equipment, piping and tanks). The study concluded that while there is a very low life safety risk due to earthquake, there could be economic and environmental impacts to MRWPCA facilities caused by an earthquake. This study is summarized below.

Local Geology

The northeastern third of the MRWPCA area is underlain by terrace and basin deposits consisting of sand, silt and clay with interbedded gravel. Coastal terrace deposits are located along the northwestern end of the project area and consist of partially lithified sands with a few thin, relatively continuous gravel layers. In the center part of the area, Holocene young floodplain deposits are associated with the Salinas River and consist of sand and silt, commonly interbedded with thin discontinuous clay layers. Lastly, coastal sand dunes border the Salinas River to the southwest portion of the area. These dunes consist of poorly lithified fine to medium-grained sands, which have a moderate to high susceptibility to liquefaction where a shallow groundwater is encountered.

Seismic Setting

The major active faults in the project vicinity are considered to be part of the San Andreas Fault System, which delineates the interaction between the Pacific and North American tectonic plates. The main faults from this system include, from west to east, the San Gregorio-Hosgri, Rinconada/King City, and San Andreas. Smaller, less active local faults of the Monterey Bay fault zone also occur in this region around MRWPCA facilities. Faults within this zone include the Tularcitos-Navy, Chupines, Ord Terrace and Seaside faults. These have lower slip rates, longer recurrence intervals, and lower Maximum Credible Earthquake (MCE) magnitudes than the main faults. Refer to Figures 5-2, Probability of Earthquake Shaking Intensity and 5-3, Regional Fault Location Map.

Historic Seismicity

The entire MRWPCA area is located in a tectonically active region, classified as Seismic Zone 4 in the Uniform Building Code (UBC). Ongoing tectonic activity within the area is reflected by historic large earthquakes (1906 San Francisco, 1989 Loma Prieta), microseismicity, and Quaternary displacements along faults. Holocene age displacements have also been documented on the San Andreas and San Gregorio faults and are associated with youthful geomorphic features of tectonic origin.

In comparison with other sites within coastal California, the Monterey area in the immediate project vicinity has experienced a relatively lower level of historic seismic activity. Seismic activity has been concentrated along the San Andreas fault, located 33 kilometers northeast of the MRWPCA's Wastewater Collection System (WCS) principal elements.

Findings

According to the Dames and Moore study, geologic hazards to the WCS of the MRWPCA facilities include principally fault rupture and liquefaction. The risk of landslides and slope failures is locally extremely low.

Fault Rupture

Fault rupture hazard maps (Figures 5-4, Fault Rupture Hazard Map, Southern MRWPCA Area and 5-5, Fault Rupture Hazard Map, North-Central MRWPCA Area) were prepared for the southern and north central portions of the MRWPCA system. Faults crossed by pipelines appear to have long recurrence intervals, on the order of thousands of years, and therefore have a low probability of rupture during a design life of 50 years (considered reasonable for MRWPCA system).

Liquefaction Susceptibility

The potential for liquefaction along the pipelines and at the various pump stations was estimated using geological and geotechnical data. Estimated depth to groundwater, soils textural characteristics, penetration resistance, and historic occurrence of liquefaction were also considered for the purpose of developing liquefaction susceptibility maps.

Refer to Figures 5-6, Liquefaction Susceptibiliity, Southern MRWPCA Area and 5-7, Liquefaction Susceptibiliity, North-Central MRWPCA Area The most critical locations within the MRWPCA area are those underlain by geologically young (Holocene) floodplain deposits along the margins of the Salinas River, small drainages, beaches and sloughs. Moderate liquefaction susceptibility is characteristic of older floodplain deposits, alluvial fan deposits and channel fill deposits. Other areas have typically low to very low liquefaction susceptibility.

The two Salinas River crossings of the Castroville and the Salinas interceptors are most vulnerable to liquefaction-induced failures. In addition, the pipeline may be highly susceptible to liquefaction near Castroville and Moss Landing. Liquefaction would be accompanied by settlement and lateral spreading of the soils supporting the pipeline. Preliminary data indicate that most of the pump stations are located on rock or stiff soils, except the Salinas, Castroville and Moss Landing pump stations. Liquefaction hazard is summarized below for the various pump stations included in this study:

Pump Station Name	Liquefaction Hazard
Coral Street	None
Fountain Avenue	None
Reeside	None
Monterey	Moderate
Seaside	Moderate
Fort Ord	Unknown (presumably moderate)
Marina	Moderate
Salinas	Moderate-to-high
Moss Landing	Moderate-to-high
Castroville	Moderate-to-high

Another study commissioned by MRWPCA, the *Enhanced Spill Prevention Plan submitted to the Monterey Regional Water Pollution Control Agency*, prepared by CH2MHill, April 18, 199l, concluded that seismic events are more likely to impact large stations than small stations. Below is a summary of the findings from this study:

The MRWPCA stations were built to comply with the seismic requirements of the Uniform Building Code in effect at the time of their design in the late 1970s and early 1980s. Since that time, there have been significant advances in understanding the nature of seismic forces and ground accelerations and in the response of structures to these accelerations. Building Codes have also been revised during this period.

Seismic events are more of a concern for the large stations-Monterey, Seaside, Fort Ord and Salinas-because of the potential for a high-volume spill. These stations cannot be pumped around, because flow rates exceed the capacity of portable pumps. The site inspections indicated that existing seismic bracing for discharge headers and pumps, and for ancillary equipment including control panels, fuel tanks and fuel piping, surge equipment, and chemical feed tanks may not meet current code requirements and may not adequately protect these components from seismic damage.

Seismic events are less of a concern for small stations, because of the small mass of the equipment and their relative mechanical simplicity. Failure of small station could result in a prolonged spill, if it occurred in conjunction with a large station failure, since MRWPCA resources may not be sufficient for concurrent response to multiple locations.

MRWPCA facilities have been constructed according the Uniform Building Code (UBC) Seismic Zone 4 standards in place at the time of construction. The full extent of damage will be exponential in comparison to the Richter magnitude scale.

Because of the history of earthquakes in the MRWPCA area, there is a very high probability of the occurrence of future earthquake events. Based on the United States Geological Survey (USGS) document, *Understanding Earthquake Hazards in the San Francisco Bay Region,* it was concluded that there is a sixty-two percent probability for one or more Richter Scale magnitude 6.7 or greater earthquakes occurring from 2003 to 2032 (Figure 5-8). Recommendations from the two studies described above will be used in the development of mitigation goals, actions and implementation measures for the MRWPCA Local Hazard Mitigation Plan, Chapter 6.

Expansive Soils

- Seismic Vulnerability Evaluation Wastewater Collection System, Monterey Regional Water Pollution Control Agency, Monterey, California, was completed in 1998 by Dames and Moore
- Foundations in Problem Soils, Steven J. Greenfield and C.K. Shen, 1992

Certain clay soils are able to “take on water” and subsequently expand when they come into contact with it. The presence of expansive soil deposits is one of the more challenging site conditions encountered in construction. In fact, estimates of total damage (to lightly loaded structures, highways and streets, underground utilities and concrete flat work) due to expansive soil movement in 2000 was estimated to be $4.5 billion. While natural disasters can cause much more catastrophic and significant damage, expansive soil movements affect a very large number structures in the United States. Expansive soil movement differs from natural disasters in the following ways: expansive soil movement is not catastrophic, it usually occurs over a relatively long period of time; damage from expansive soils is a continual process; expansive soils are locally erratic, making it impractical to delineate levels of damage potential.

An extensive geologic investigation done by Dames and Moore found that some areas of the MRWPCA service area may be susceptible to expansive soils. The “Seismic Vulnerability Evaluation Wastewater Collection System”, included a geologic investigation which consisted of literature compilation and review, a detailed review of applicable geologic maps and a facility walk-down. Findings concluded that Pleistocene terrace deposits and Holocene basin deposits found in the northern one-third of the area:

- Pleistocene terrace deposits low susceptibility to flooding and liquefaction, and may contain expansive soils.
- Holocene basin deposits have a high susceptibility to flooding, a moderate to high susceptibility to liquefaction where groundwater is within about 35 feet of the surface, and contain highly expansive soils.

Since there is evidence that expansive soils may be encountered, they will be considered in this local hazard mitigation plan.

Flood

- Understanding '100-year flood' by Carol Kimbrell, (http://www.lcra.org/featurestory/2003/2003_3_25_flood_sidebar.html)
- Enhanced Spill Prevention Plan submitted to the Monterey Regional Water Pollution Control Agency, prepared by CH2MHill. April 18, 1991

The term "100-year flood" means that there is a 1 percent (one in 100) chance that a flood of that magnitude will occur in any given year. Contrary to popular belief, it does not mean that it is a flood that occurs only once every century. The term describes the magnitude of flood and has nothing to do with how often such floods occur. In fact, several 100-year floods can occur within the same year, or a region may go several

hundred years without experiencing a 100-year flood. A 100-year flood is often used as a benchmark for catastrophic flooding. A 500-year flood, which is a greater flood, has a 0.2 percent (one in 500) chance of occurring in any given year.

The *Enhanced Spill Prevention Plan submitted to the Monterey Regional Water Pollution Control Agency,* prepared by CH2MHill in April of 1991, explored the risk of damage to MRWPCA facilities due to flooding.

According to the plan, MRWPCA's Salinas and Castroville pump stations are within the flood plain of major rivers or their tributaries and are designed to prevent inundation in a 100-year flood. Flooding in 1995, estimated to exceed a 150-year recurrence interval, inundated the Castroville station and nearly isolated the Salinas station. Since then, the MRWPCA has taken steps to avert future flooding, including stockpiling of sand bagging materials and improved sealing of station doors, vents and other openings. Given the relatively rare nature of floods of this magnitude, it does not appear that major investment into further modification at these stations is warranted.

The MRWPCA's Coral Street Pump Station has been flooded by wave runup from Monterey Bay.

The remaining large stations are not in flood-prone areas. Flooding of tile smaller stations, like Moss Landing, is also less of a concern, as they are generally equipped with submersible pumps which would not he damaged by inundation. Refer to Figure 5-9, which shows the flood zones affecting MRWPCA.

In any one year, the probability of the occurrence of a 100- or 500-year flood affecting MRWPCA facilities is low. There is, however, a high probability that localized flooding will occur in areas that could affect pump stations such as Coral Street. This document will address mitigation measures for localized flooding and for 100-year floods. Mitigation goals, actions and implementation measures for flooding hazards will be developed in Chapter 6 of this Local Hazard Mitigation Plan, using recommendations from the *Enhanced Spill Prevention Plan.*

Land Subsidence

- from Gamma Remote Sensing, www.gamma-rs.ch
- Review of Potential Damage to Force Mains at 10 Pump Stations due to Long-Term Settlement for Monterey Regional Water Pollution Control Agency, Monterey, California, by MMI Engineering, Inc., March 28, 2003

Subsidence can occur as the result of the natural compaction of sediments. In particular, most areas of known subsidence are along coasts where the phenomenon becomes quite

obvious when the ocean or lake waters start coming further up on the shore. Surface sinking is a slow event and hazards associated with subsidence are different from those caused by sudden and catastrophic natural events like floods and earthquakes. However, extremely expansive damages can still occur.

The *Review of Potential Damage to Force Mains at 10 Pump Stations due to Long-Term Settlement for Monterey Regional Water Pollution Control Agency, Monterey, California* was completed by MMI Engineering, Inc., in 2003. This report was the result of a system vulnerability study for MRWPCA's ten pump stations in an effort to reduce the risk of potential sewerage spills. The study focused on non-seismic issues such as internal and external corrosion, operating pressures and foundation settlement. The focus of the study was to evaluate the potential for damage due to long-term settlement of underlying soils. Following is a summary of the study's conclusions.

According to the MMI report, damage to force mains due to long-term settlement of the underlying soil because of poorly compacted backfill is not very common. This is especially true for structures that have been in existence for over 10 to 20 years built using well constructed engineered subgrade. The original construction specifications and geotechnical reports for the pump stations were reviewed and nothing was found that would suggest a potential problem. Construction specifications for the pump stations required that the subgrade and backfill be compacted to 90% to 95% relative compaction, which is not likely to exhibit significant long-term settlement. Therefore, the probability of force main rupturing from settlement of backfill during static (i.e., non-seismic) conditions is very low and it does not warrant the disruption in service and the cost associated with either adding flexibility to the force mains or performing additional investigations to further reduce the probability of failure.

Signs of settlement were noted at the Salinas Pump Station some years ago and MRWPCA retained the services of two geotechnical engineers to determine the cause of settlement. The force main was exposed at that time and the coupling was inspected by a representative of the coupling manufacturer who did not find any evidence of distress. The geotechnical engineers did not come to a general consensus regarding the causes of settlement.

Therefore, while there is little evidence of land subsidence affecting MRWPCA facilities, this LHMP will consider recommending monitoring for any signs of excessive settlement to force mains.

Landslide

- U.S. Geological Survey, U.S. Department of the Interior, http://landslides.usgs.gov
- *Seismic Vulnerability Evaluation Wastewater Collection System,* Monterey Regional Water Pollution Control Agency, Monterey, California, was completed in 1998 by Dames and Moore

The term landslide includes a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on an over steepened slope is the primary reason for a landslide, there are other contributing factors such as soil failure due to saturation from heavy rainfall, excess weight from man-made structures that stress weaken a slope, and earthquakes of magnitudes as small as 4.0. Slope material that becomes saturated with water may develop a debris flow or mud flow. The resulting slurry of rock and mud may pick up trees, houses, and cars, thus blocking bridges and tributaries causing flooding along its path.

The coastal areas of California are among the primary regions of landslide occurrence and potential in the United States. Sandy soils are susceptible to earthflows (where dry granular slope materials liquefy and run out, forming a bowl or depression at the head), mudflows (an earthflow consisting of material that is wet enough to flow rapidly and that contains at least 50 % sand-, silt- or clay-sized particles), and lateral spreads (which occur on very gentle slopes or flat terrain, caused by liquefaction, the process whereby saturated, loose, sandy soils are transformed from a solid into a liquefied state). Landslides can be caused by slope saturation by water or seismic activity.

Soils investigations were done in 1998 by Dames and Moore for the *Seismic Vulnerability Evaluation Wastewater Collection System.* Based on field inspection, facility walk-down , and of compilation and review of applicable maps and literature, it was concluded that for the majority of the system, the risk of landslides and slope failures is locally extremely low. However, one exception is the Salinas interceptor, where landslides had been identified. The Salinas Interceptor between the Salinas River crossing and southeast of the Regional Treatment Facility, and along the western margin of the Salinas River are susceptible to landsliding. Along this part of the Salinas Interceptor, several shallow to moderately deep landslides within the older dune deposits exist to the east of the pipeline. These slides do not currently affect the pipeline which is located 10- to 15 feet away from the slide areas, but these slides and adjacent steep slopes could be subject to movement during an earthquake. Landslides will not be included in the mitigation section of this document, but the Salinas Interceptor's susceptibility of landsliding will be addressed under Earthquake in the mitigation section.

Tsunami

- Tsunami Hazard Mitigation, A Report to the Senate Appropriations Committee, prepared by the National Oceanic and Atmospheric Administration Pacific Marine Environmental Laboratory, March 31, 1995 (www.pmel.noaa.gov)
- California Office of Emergency Services
- Monterey County Office of Emergency Services, (www.co.monterey.ca.us/oes/tsunamis.htm)

A tsunami, sometimes incorrectly called a tidal wave, is actually a series of enormous waves created by an underwater disturbance or earthquake. Tsunamis can move hundreds of miles per hour in the open ocean and crash into land with waves that are more than 100 feet high.

MRWPCA facilities are located within Tsunami Zone 2, which is characterized as having a potential for 5-15 foot wave crests. U.S. coastal areas are threatened by tsunamis that are generated by both local earthquakes and distant earthquakes.

Local tsunamis give people only a few minutes to seek safety. Tsunamis of distant origins give people more time to evacuate threatened coastal areas but increase the need for timely and accurate assessment of the tsunami hazard to avoid costly false alarms. Thus, the west coast could be affected by a local tsunami that may also have an impact on the distant states of Alaska and Hawaii. Of the two, local tsunamis are more devastating.

The greatest threat is local tsunamis generated off the U.S. Coast. In fact, in this century, there have been more than 200 tsunamis recorded in the Pacific Ocean. The Cascadia Subduction Zone threatens California, Oregon, and Washington with devastating local tsunamis (Refer to Figure 5-10, Tsunami Hazard for the United States) that could strike the coast within minutes. There is increasing geological and seismological evidence that: earthquakes of Richter scale magnitude 8 and more have previously occurred in this region; at least one segment of the subduction zone may be approaching the end of a seismic cycle culminating in such an earthquake; and, these earthquakes have generated tsunamis that have caused extensive flooding along the coastline of California (Heaton and Hartzell, 1987; Weaver and Shedlock, 1992). Recent articles (Waethrich, 1994) indicate that the probability of a Cascadia earthquake occurring is comparable to that of large earthquakes in southern California (i.e., 35% probability of magnitude of 8 or above between 1995-2045). A reminder of this threat occurred in April 1992 when a small tsunami was generated at the southern end of the Cascadia Subduction Zone by a large (7.1 MS) earthquake near Cape Mendocino, California (Gonzalez and Bernard, 1992). This tsunami arrived at Eureka, California only 15 minutes after the earthquake origin time.

The silent threat, however, is a tsunami generated at a distance. The United States has suffered major damage from tsunamis originating in Chile, Japan, Russia, and Alaska. If an earthquake in Alaska generated a major tsunami, Alaskan shores would be flooded within 15 minutes, while the coast of California would be hit within 5 hours after the event.

There is a history of tsunamis off the coast of California and specifically in the Monterey Bay area. In March of 1964, there was a small tsunami that affected the Monterey Bay area. This was the same event that killed 11 people and did much damage to the City of Crescent City to the north. An 11-foot wave came ashore in Santa Cruz harbor, which damaged boats and harbor facilities. At Monterey Harbor, a wave estimated at 5-6 feet in height caused little damage other than to some boats and caused minor flooding in the low-lying harbor area. Other tsunami events in 1960, December 2004 and June 2005 produced negligible (less than a foot) waves, and no recorded damage to the Monterey Bay area.

In response the tsunami threat, the Monterey County Office of Emergency Services has organized Tsunami Incident Response Plan Planning Group. The intent of the plan is to develop procedures to follow in the event of a tsunami watch or warning, beginning with the receipt and dissemination of the watch or warning message. The planning group has members from all coastal jurisdictions in Monterey County, along with state and federal government. Specifically, there is representation from: the Cities of Seaside, Marina, Sand City, Monterey, Pacific Grove, and Carmel (law enforcement, fire, or both); the Monterey County unincorporated county areas of North County Fire, Big Sur Volunteer Fire, Sheriff's Office, the Pebble Beach Company, and Monterey County Office of Emergency Services; state level representatives from California Department of Forestry (Pebble Beach Fire, Cypress Fire, Carmel Highlands Fire) and State Parks, along with both the Moss Landing and Monterey Harbor Districts; and Federal level representation from the United States Coast Guard. There are Geographical Information System (GIS)-derived maps in place that show which areas may need to be evacuated in the event of a tsunami warning. Depending on the jurisdiction type, each jurisdiction will develop procedures for responding to a tsunami warning, including evacuating people in low-lying areas, clearing the beaches and harbors, and sending boats out to sea. There will be pre-designated shelters and/or safe zones to which people can evacuate, and evacuation routes. Public education is a key issue in the planning process, since this will significantly reduce confusion, panic, and congestion in the evacuation zones. For near-shore events, public education is the only tool that will work, since there will not be enough time to organize an evacuation with a wave potentially approaching the shore in less than a half an hour. People will simply have to know what to do. A goal is to have tsunami information in phone books, at kiosks or information booths or on signs in high traffic pedestrian areas (Laguna Grande and El Estero Parks, Cannery Row, Fisherman's Wharf, beaches, etc.). The resulting Tsunami Incident Response Plan will be integrated with the previously developed Coastal Incident Response Plan.

In fact, MRWPCA's greatest concern is when their pump stations are inundated by a heavy storm or by a tsunami. They have an emergency response plan in place, which includes the use of generator power. This plan was in place for the earthquakes of 1995 and 1997.

There is a high probability that an earthquake will occur either locally or from a distance. An earthquake could trigger a tsunami in the Monterey Bay area. If a tsunami were to hit there, damage could be extensive. Refer to the Tsunami Evacuation Areas Map, Figure 5-11, prepared by the County of Monterey Office of Emergency Services. Mitigation for the tsunami hazard will be discussed later in this document.

Wildfire

- Monterey Regional Water Pollution Control Agency Wildland Fire Threat Categories Map, prepared by the Office of Emergency Services

The State of California Department of Forestry rates some areas in Monterey County as extreme wildfire hazard areas based on slope characteristics, climate, fuel loading, and water availability. This occurs in areas of undeveloped hilly terrain, which contain a mix of brush, scrub, and tree cover. This type of fuel and terrain poses the threat of rapid-fire development and spread. According to Figure 5-12, Wildfire Hazards, prepared by the Monterey County Office of Emergency Services (OES), none of the MRWPCA facilities are in areas of high wildfire danger.

Therefore, mitigation for wildfires will not be explored later in this LHMP.

MANMADE HAZARDS

Bomb Threat

- MRWPCA Business Response Plan, Procedure No. BRP-006 Bomb Threat

The MRWPCA Business Response Plan outlines procedures for dealing a bomb threat, including a checklist for dealing with a person who calls in a bomb threat.

Hazardous Material Incidents

- MRWPCA Business Response Plan, Procedure No. BRP-007 Hazardous Material Incidents

The MRWPCA Business Response Plan outlines procedures for responding to a hazardous material incident. The plan describes the hazardous materials used in the processes and equipment which support the treatment of wastewater and how to safely handle, store, and control hazardous materials in order not to endanger the public, the environment or MRWPCA employees

Section B. Assessing Vulnerability

Overall Summary of Vulnerabilities

Section A, Identifying and Profiling Hazards, describes the MRWPCA LHMP Committee's analysis of the list of possible natural hazards. Based on locations, extents, previous occurrences, and probabilities of future events, the group determined that MRWPCA facilities are vulnerable to the following natural hazards: Coastal Erosion, Coastal Storm, Earthquake, Expansive Soils, Flood, and Tsunami.

As discussed in Chapter 3, the MRWPCA service area includes the member communities of Pacific Grove, Monterey, Del Rey Oaks, Seaside, Sand City, Fort Ord, Marina, Castroville and Moss Landing. This section explores the vulnerabilities of MRWPCA facilities to the natural hazards listed above by looking at the impacts each hazard would have on specific sections of the system to each section's buildings and infrastructure.

Methodology for Determining Impact of Hazards

The MRWPCA service area has been divided into four sections, based on similar geological characteristics. Refer to Figure 5-13, Map Showing MRWPCA Mitigation Planning Areas. Each of these mitigation planning areas is described below. The types of assets that would be at risk in the event of a hazard are also given for each area. The extent of the projected impacts on each area for each of the four hazards identified (in terms of percentage damaged) are listed in Appendix 5-A, Estimated Impacts for Each Hazard.

Area Descriptions and Types of Assets at Risk for Each Area

Figure 5-13 shows how the MRWPCA service area has been divided into the following sections:

Oceanside Pump Stations and Pipelines: This area includes the Coral Street, Fountain Avenue, Reeside, Monterey, Seaside, Fort Ord, Marina and Moss Landing Pump Stations and associated pipelines. Assets at risk include these pump stations and pipelines. With the exception of the Reeside Pump Station, which was built in 1942, they were built between 1977 and 1991. Also at risk are MRWPCA personnel who may be working on the facilities at the time disaster hits.

Inland Pump Stations and Pipelines: The Castroville and Salinas Pump Stations, along with their pipelines make up this area. These pump stations and pipelines, built between 1981 and 1983, are vulnerable to natural hazards. MRWPCA personnel who may be working on the facilities when a hazard occurs would also be vulnerable.

Regional Treatment Plant (RTP): This area includes the Regional Treatment Plant complex, located at 14201 Del Monte Blvd, in Marina. Though the facility could be at risk during a

natural hazard. It was built in 1990 to current seismic zone 4 requirements. Also, there are 55 employees at the RTP who also be at risk.

Administrative Offices: The administrative offices for the Monterey Regional Pollution Control Agency are located at 5 Harris Court in Monterey. 20 full-time and 2 temporary employees work at this MRWPCA office. They, along with the building itself, are vulnerable in the event of a hazard. The building was built in 1990 to current seismic zone 4 requirements.

Extent of Impacts

The extent of the impacts for Coastal Erosion, Coastal Storm, Earthquake, Expansive Soils, Flood, and Tsunami are given for each of the above areas (in terms of percentage damaged) in Appendix 5-A.

Data for estimating potential dollar losses to vulnerable infrastructure are not yet available. These values will be included in future updates of the Local Hazard Mitigation Plan as data become available.

Previous and Future Events

Information on previous occurrences of each hazard described above is provided in Appendix 5-B.

The probability of future events for each hazard described above is calculated in Appendix 5-C.

Figures

Appendix

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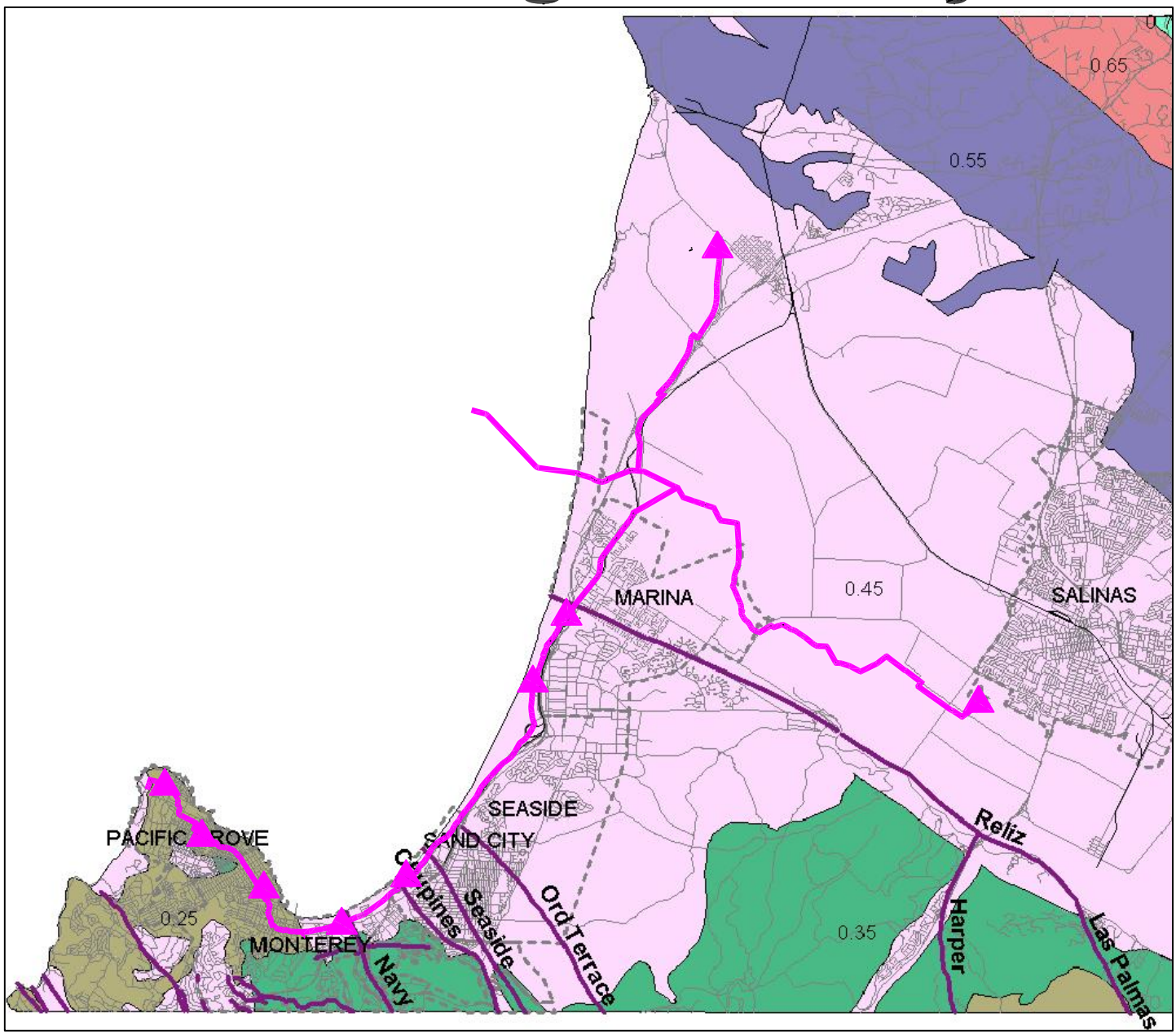
Figure 5-1: Profiling Hazards Checklist
MRWPCA Local Hazard Mitigation Plan

Hazard Type	Hazards Identified Per Requirement 201.6(c)(2)(i)	A. Location Identified	B. Extent Indentified	C. Information on Previous Occurrances	D. Probably of Future Events
Natural Hazards:					
Avalanche					
Coastal Erosion	X	X	X	X	X
Coastal Storm	X	X	X	X	X
Drought	X				
Earthquake	X	X	X	X	X
Expansive Soils	X	X	X	X	X
Extreme Heat					
Flood	X	X	X	X	X
Hailstorm					
Hurricane					
Land Subsidence	X				
Landslide	X				
Severe Winter Storm					
Tornado					
Tsunami	X	X	X	X	X
Volcano					
Wildfire	X				
Windstorm					
Manmade Hazards:					
Bomb Threat	X				X
Hazardous Materials	X	X	X		X

	Hazards to be considered in the MRWPCA LHMP
	Hazards NOT to be considered in the MRWPCA LHMP

Probability of Earthquake Shaking Intensity



LEGEND

- CITY LIMIT LINES
- STREETS & HIGHWAYS
- RAILROADS
- REGIONAL INTERCEPTORS
- PUMP STATION

0.25	0.55
0.35	0.65
0.45	0.75

Note: Seismic shaking level is represented as peak ground acceleration with greater than 10% probability of being exceeded in 50 years.

Figure 5-2 Probability of Earthquake Shaking Intensity

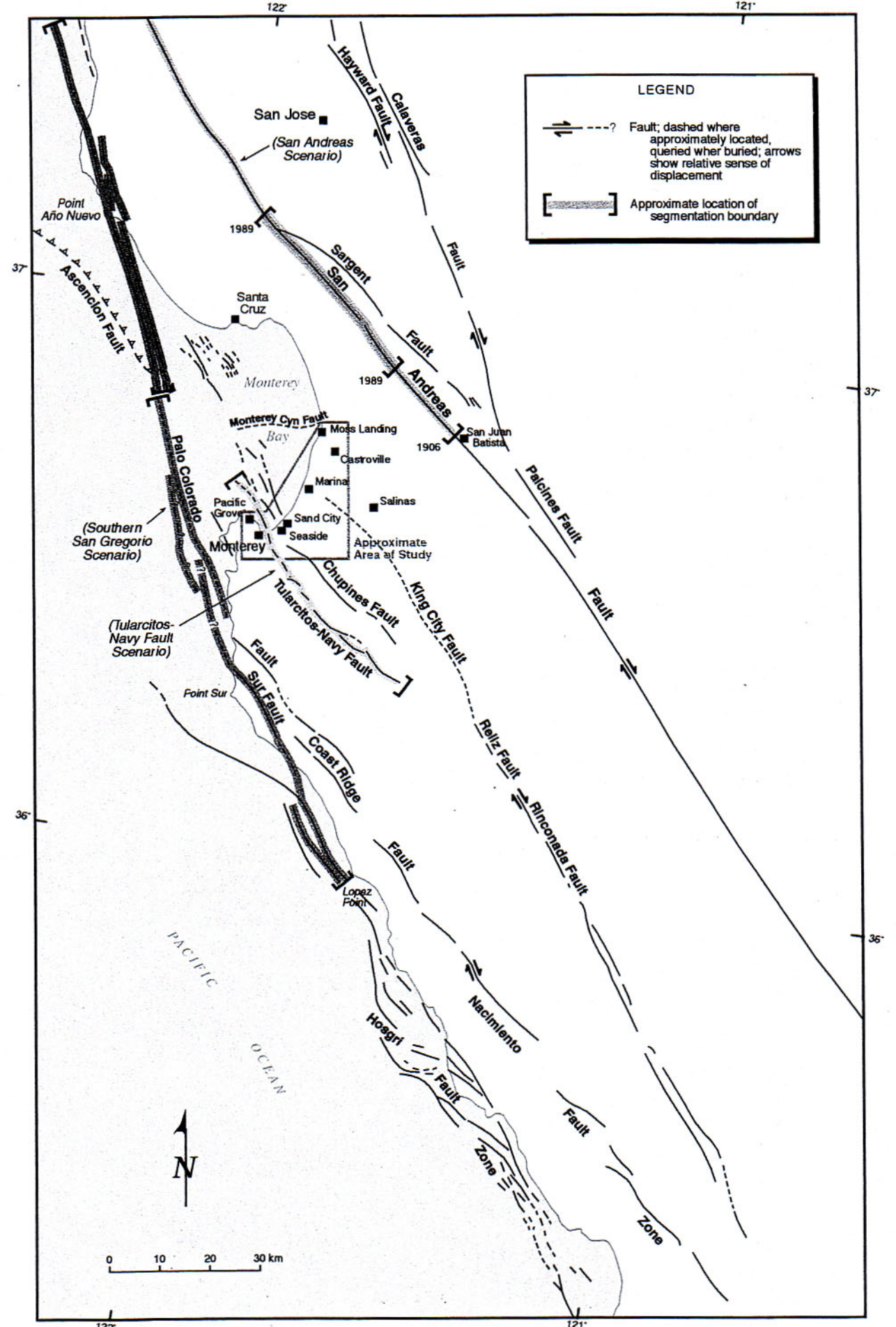


Figure 5-3 Regional Fault Location Map

(from Dames and Moore, Seismic Vulnerability Evaluation Wastewater Collection System Monterey Regional Water Pollution Control Agency, Monterey, CA, August 19, 1998)

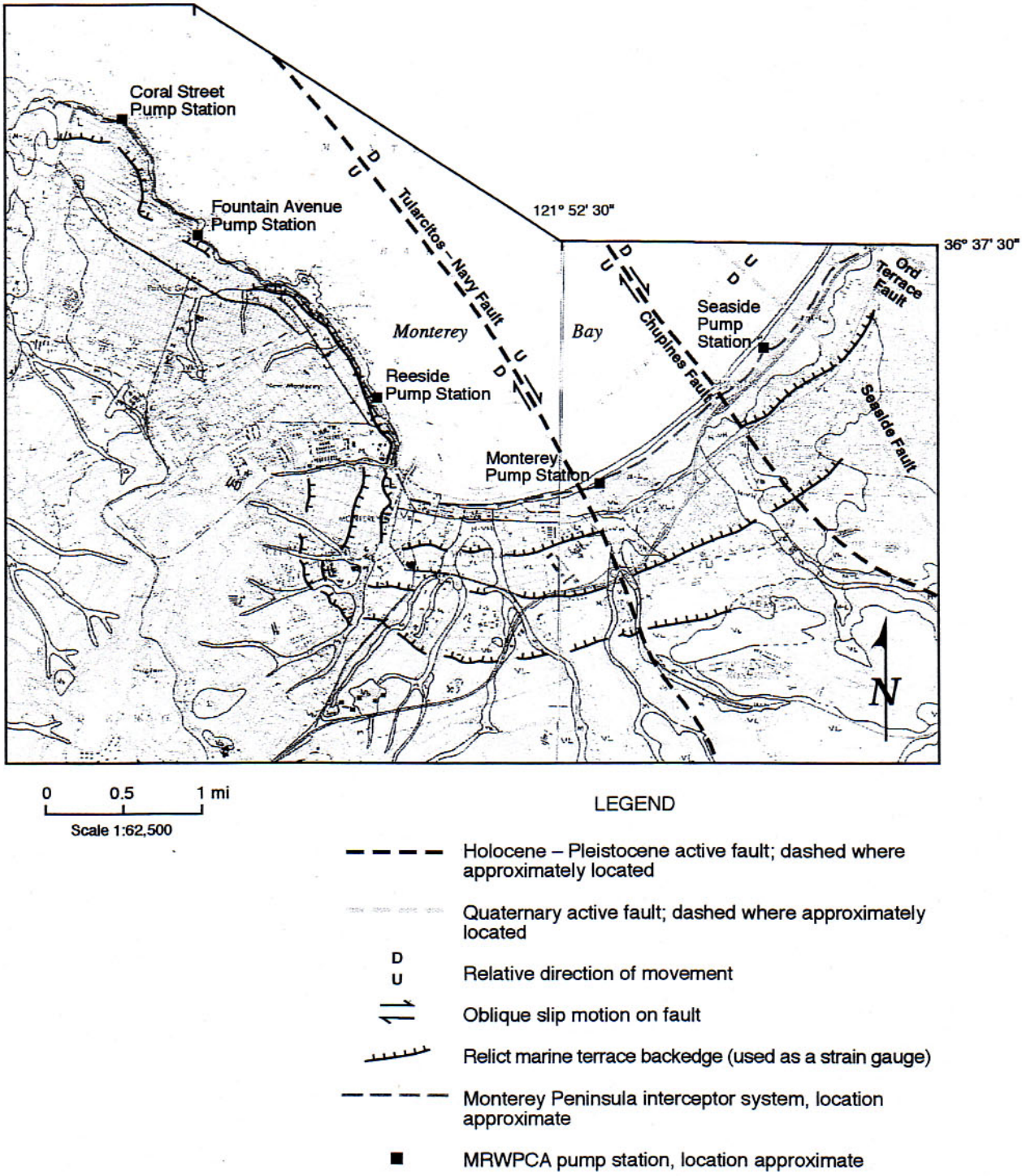


Figure 5-4 Fault Rupture Hazard Map, Southern MRWPCA Area
(from Dames and Moore, Seismic Vulnerability Evaluation Wastewater Collection System Monterey Regional Water Pollution Control Agency, Monterey, CA, August 19, 1998)

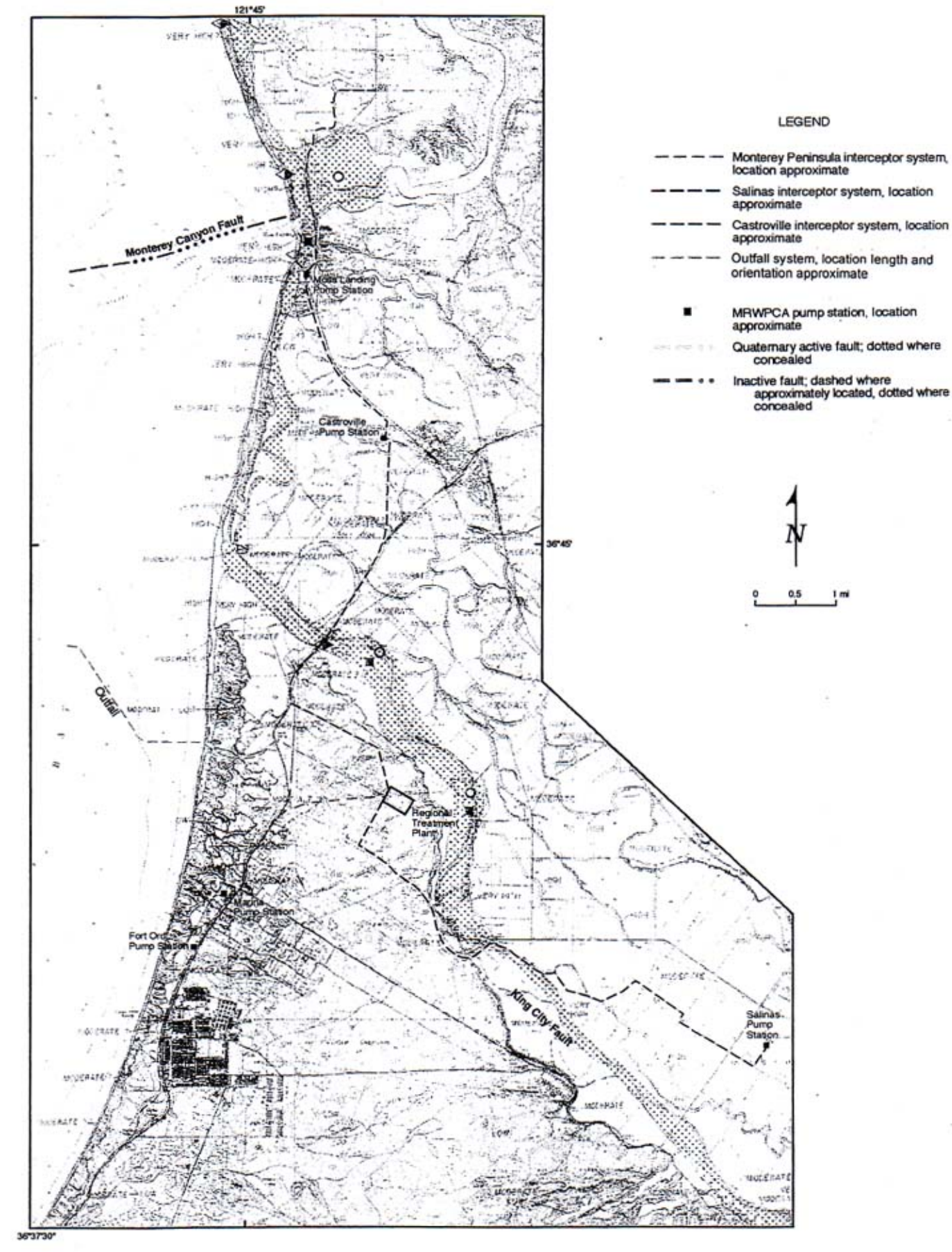


Figure 5-5 Fault Rupture Hazard Map, North-Central MRWPCA Area
(from Dames and Moore, Seismic Vulnerability Evaluation Wastewater Collection System Monterey Regional Water Pollution Control Agency, Monterey, CA, August 19, 1998)

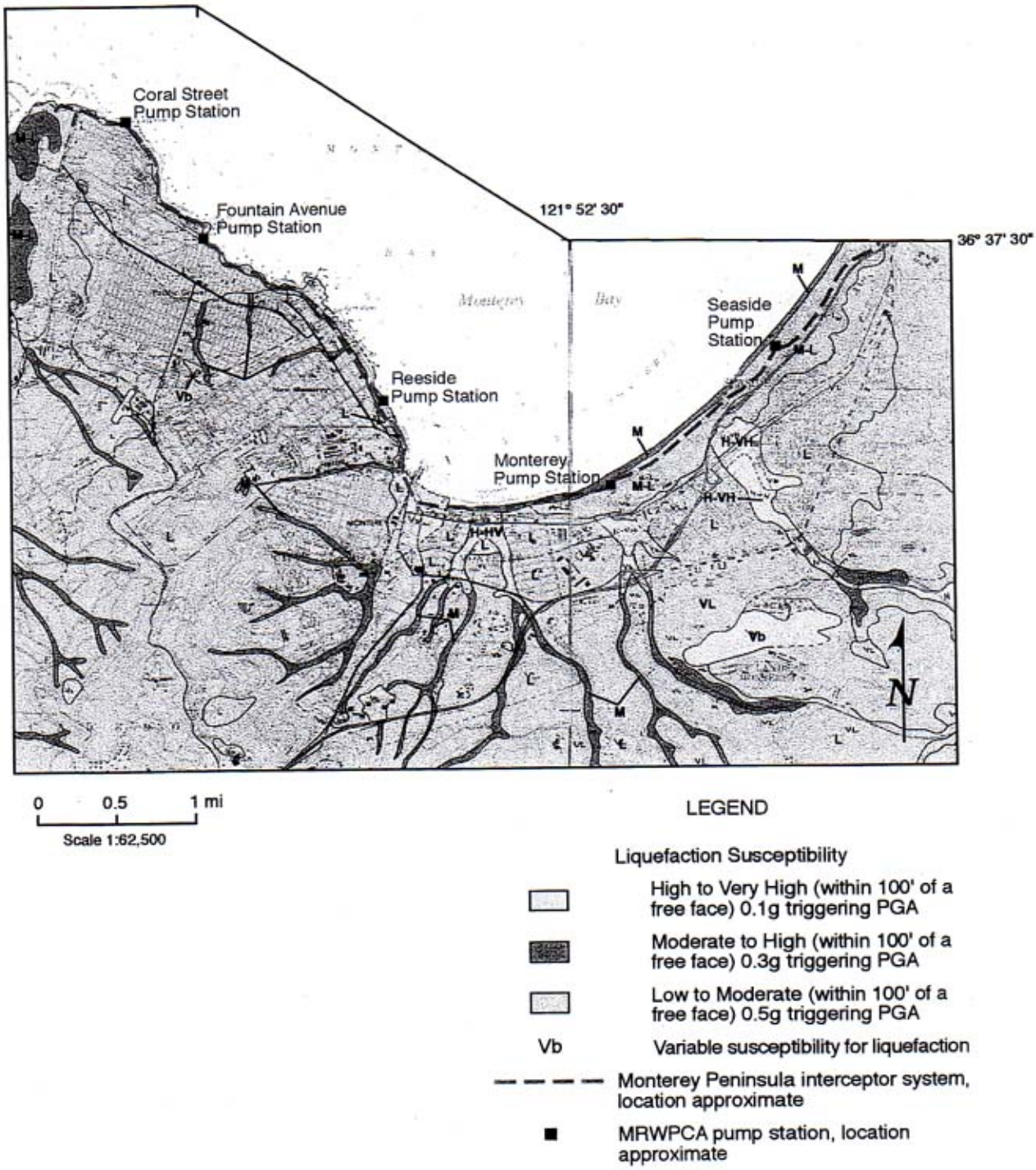


Figure 5-6 Liquefaction Susceptibility, Southern MRWPCA Area
(from Dames and Moore, Seismic Vulnerability Evaluation Wastewater Collection System Monterey Regional Water Pollution Control Agency, Monterey, CA, August 19, 1998)

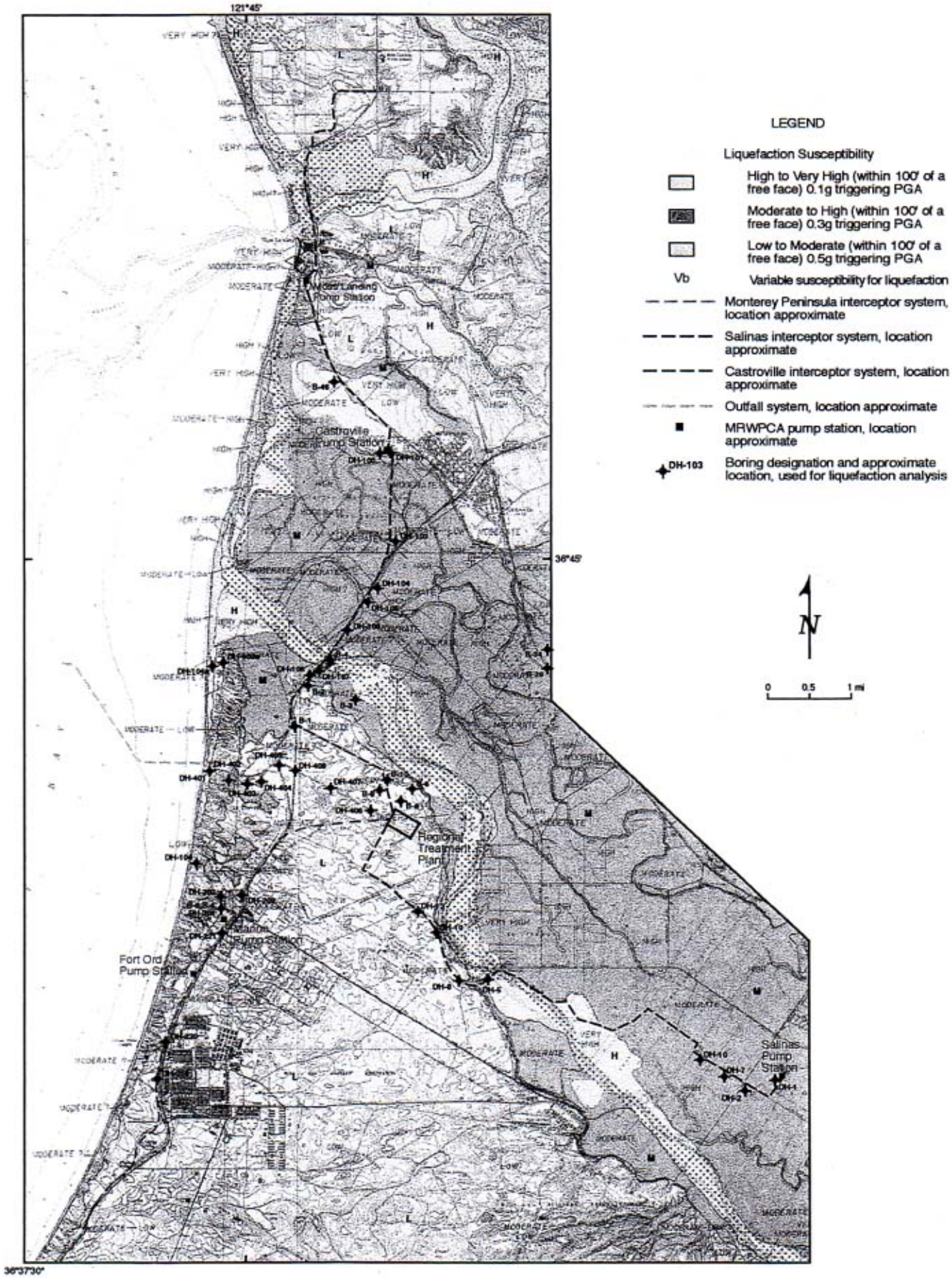
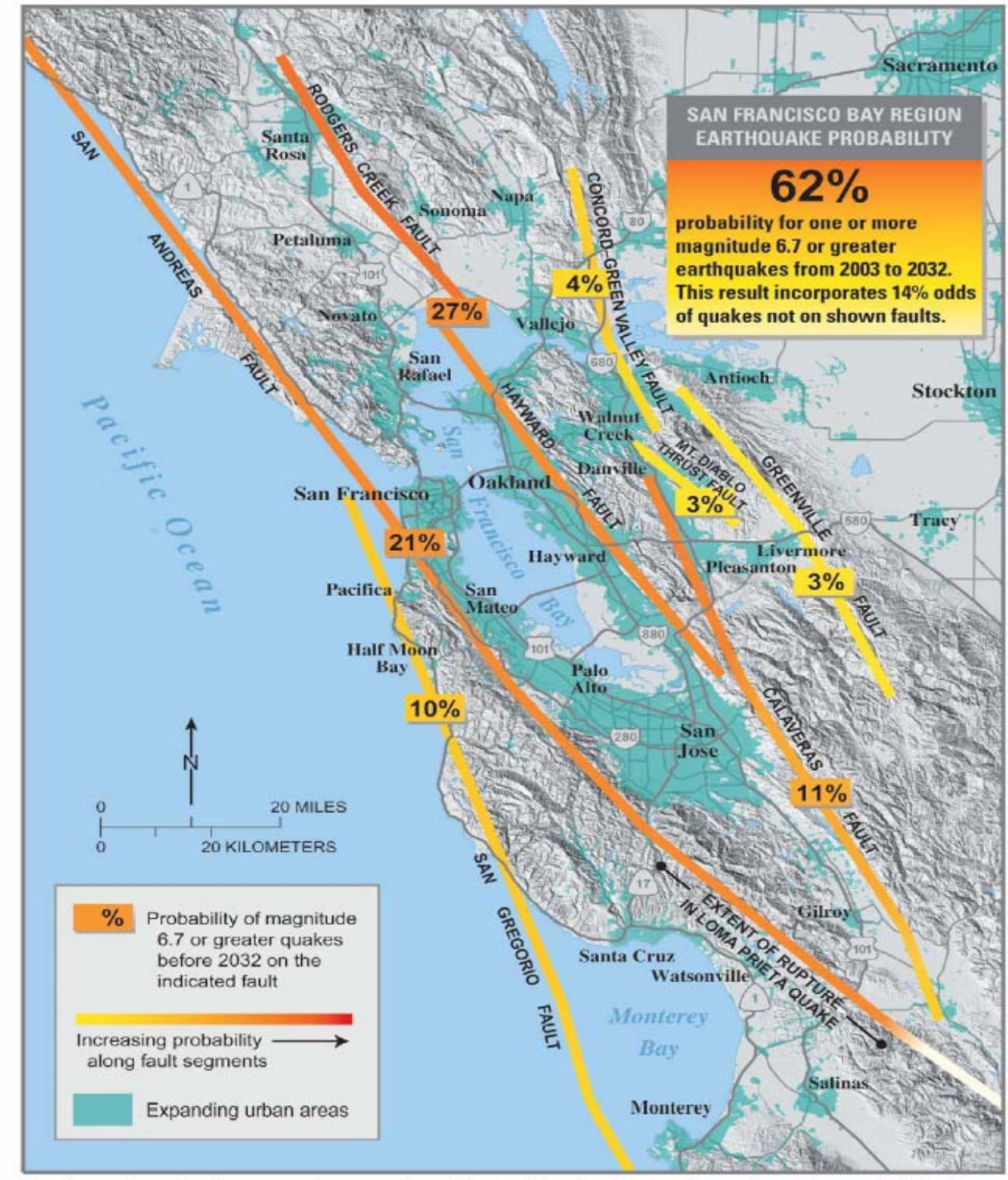


Figure 5-7 Liquefaction Susceptibility, North-Central MRWPCA Area
(from Dames and Moore, Seismic Vulnerability Evaluation Wastewater Collection System Monterey Regional Water Pollution Control Agency, Monterey, CA, August 19, 1998)

Figure 5-8
MRWPCA Local Hazard Mitigation Plan
USGS Earthquake Probability Map

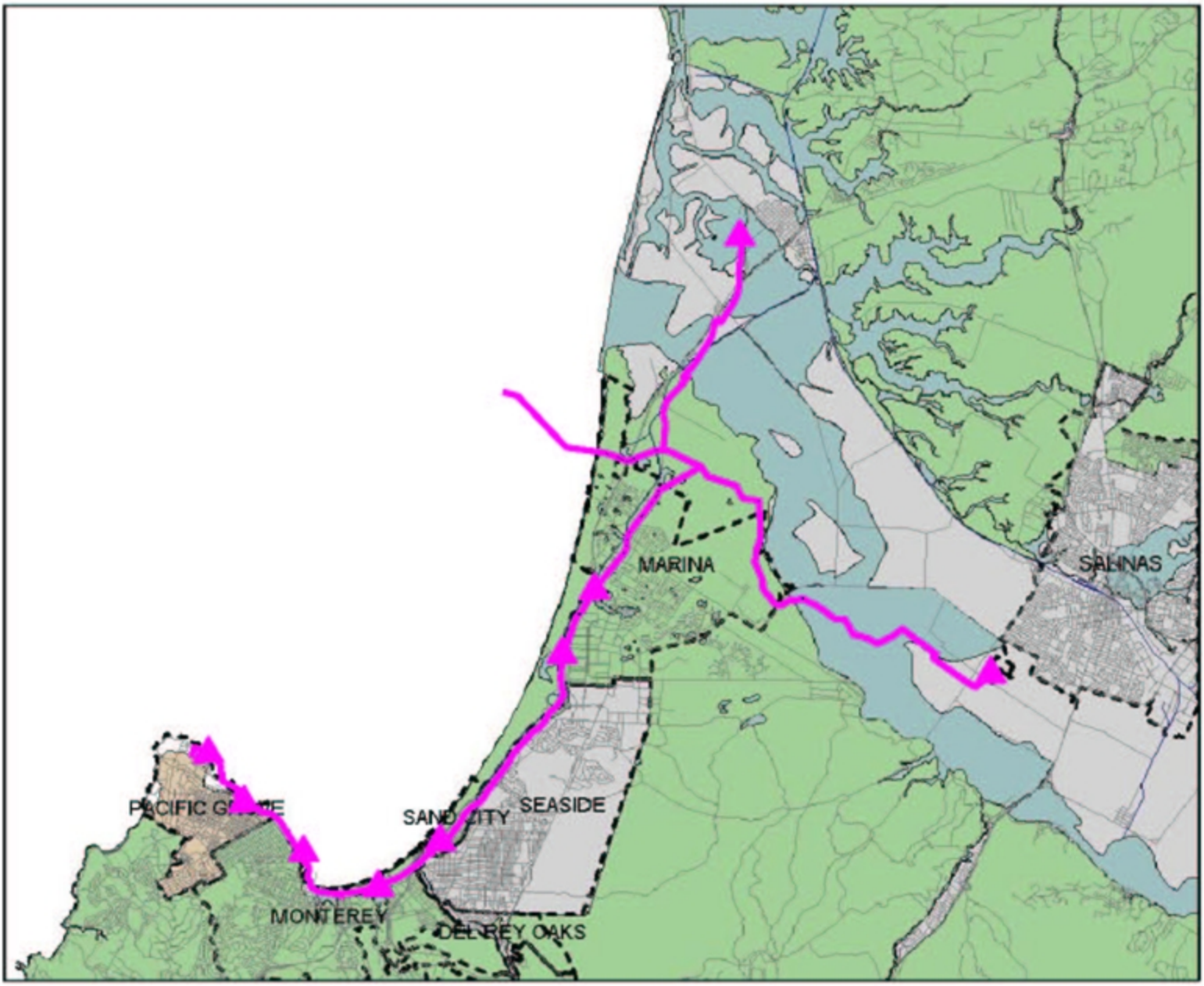


The threat of earthquakes extends across the entire San Francisco Bay region, and a major quake is likely before 2032. Knowing this will help people make informed decisions as they continue to prepare for future quakes.

http://pubs.usgs.gov/fs/2003/fs039-03/fs039-03.pdf

Figure 5-9

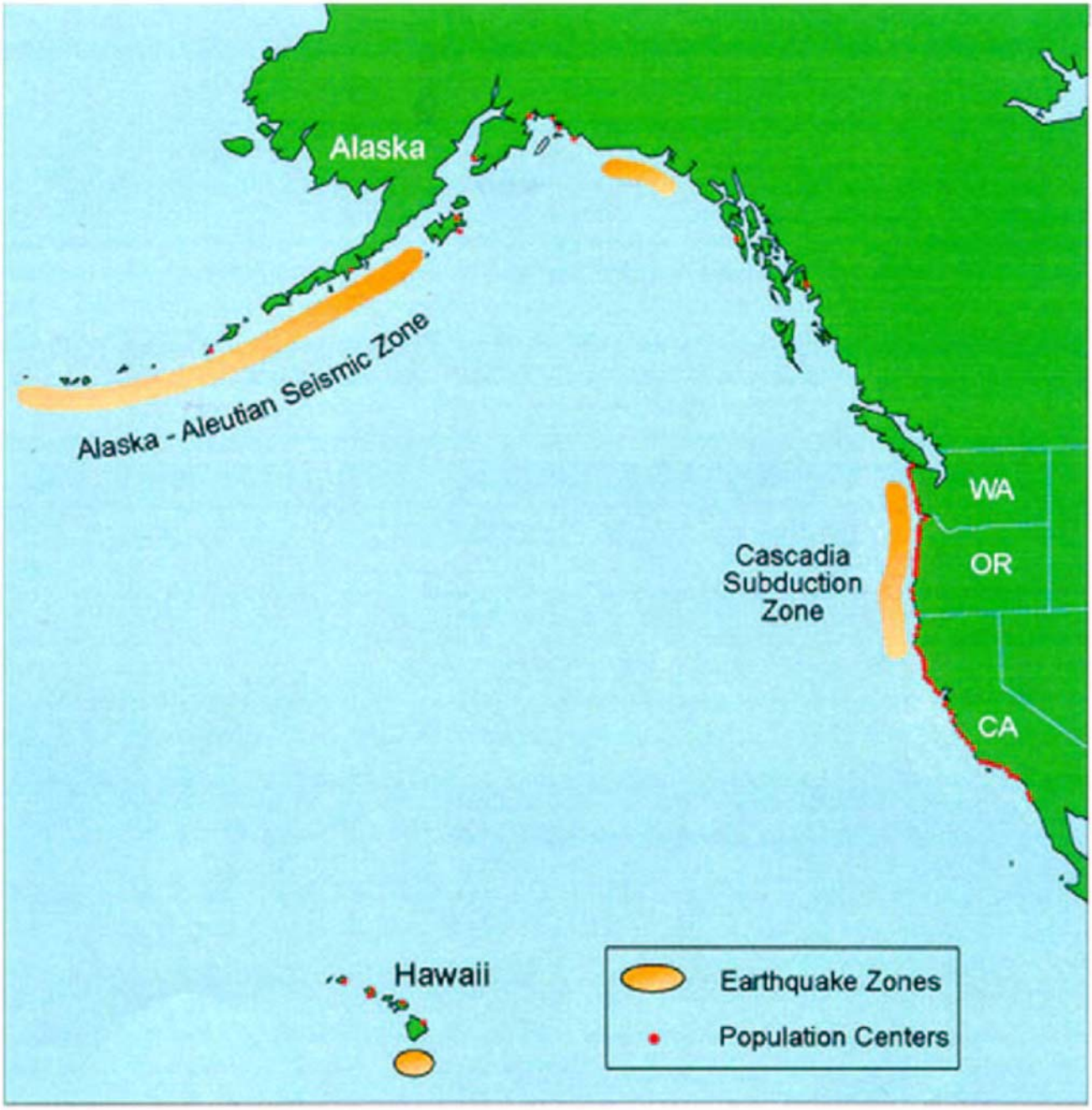
FLOOD ZONES



LEGEND

- CITY LIMIT LINES
- STREETS & HIGHWAYS
- RAILROADS
- REGIONAL INTERCEPTORS
- PUMP STATION
- Zone A: Areas within the 100 year floodplain
- Zone ANI: Area not included in the Flood Insurance Study
- Zone X: Areas outside the 100-year floodplain
- Zone X500: Areas within the 500 year floodplain

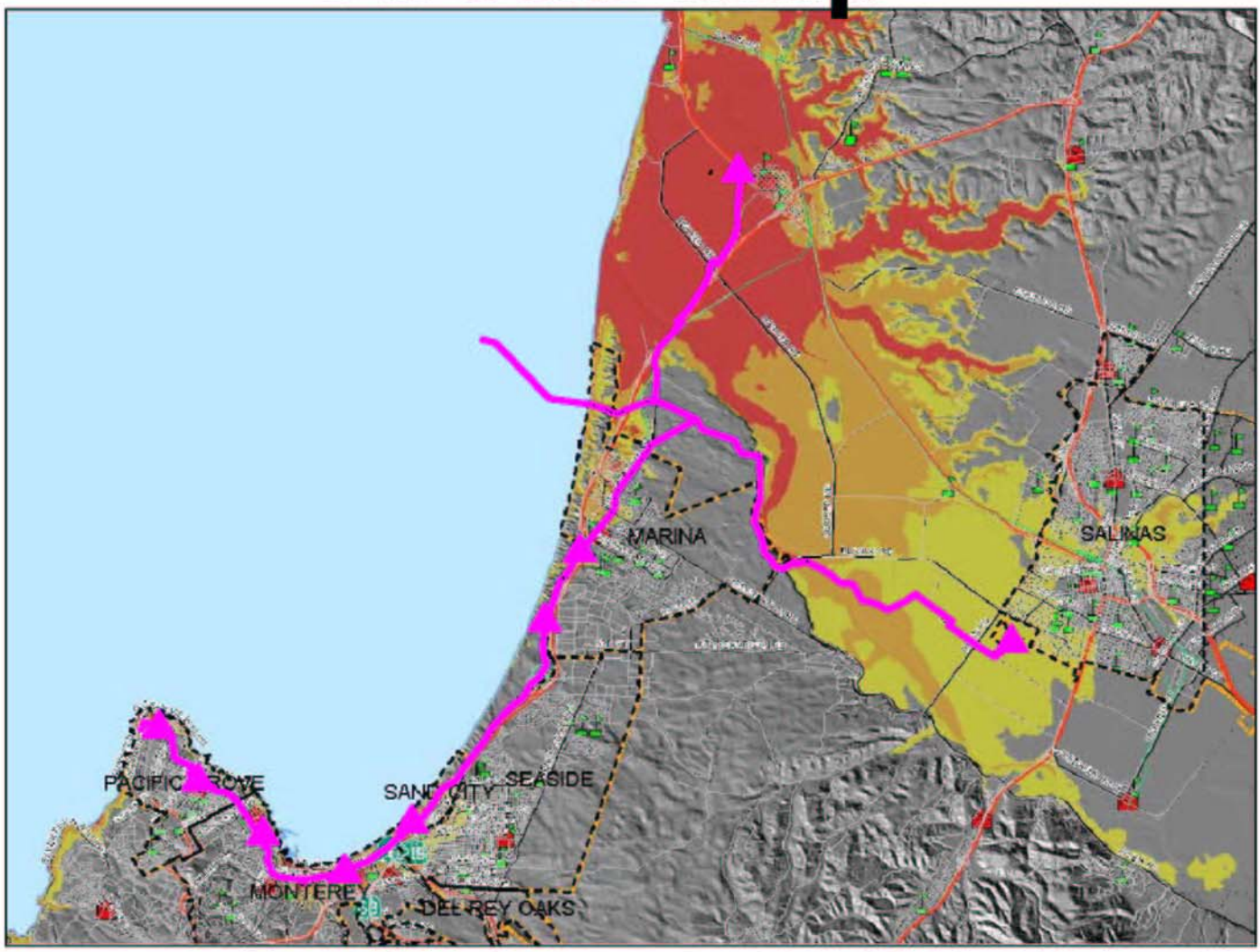
Figure 5-10
Tsunami Hazard for the United States



Tsunami hazard for the United States is defined by the earthquake zones capable of generating tsunamis in the Alaska-Aleutian Seismic Zone, the Cascadia Subduction Zone, and Hawaii. The populations at risk from tsunami are identified as population centers.

Figure 5-11

Tsunami Evacuation Areas Map



LEGEND

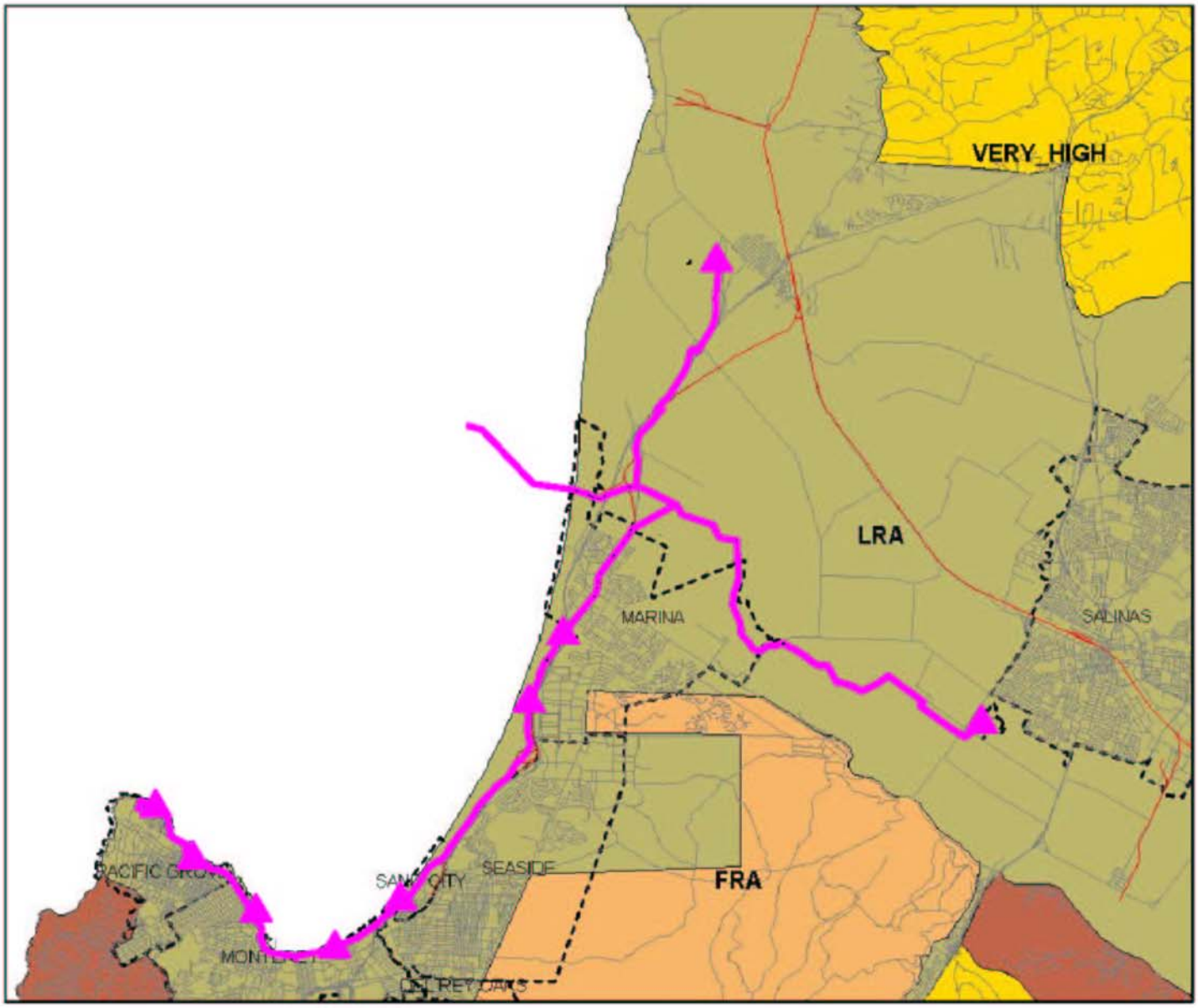
- CITY LIMIT LINES
- STREETS & HIGHWAYS
- RAILROADS
- REGIONAL INTERCEPTORS
- PUMP STATION

- 0-5 feet
- 5-10 feet
- 10-15 feet

Note: Potential Tsunami wave runup is indicated by height contours measured in feet.

Figure 5-12

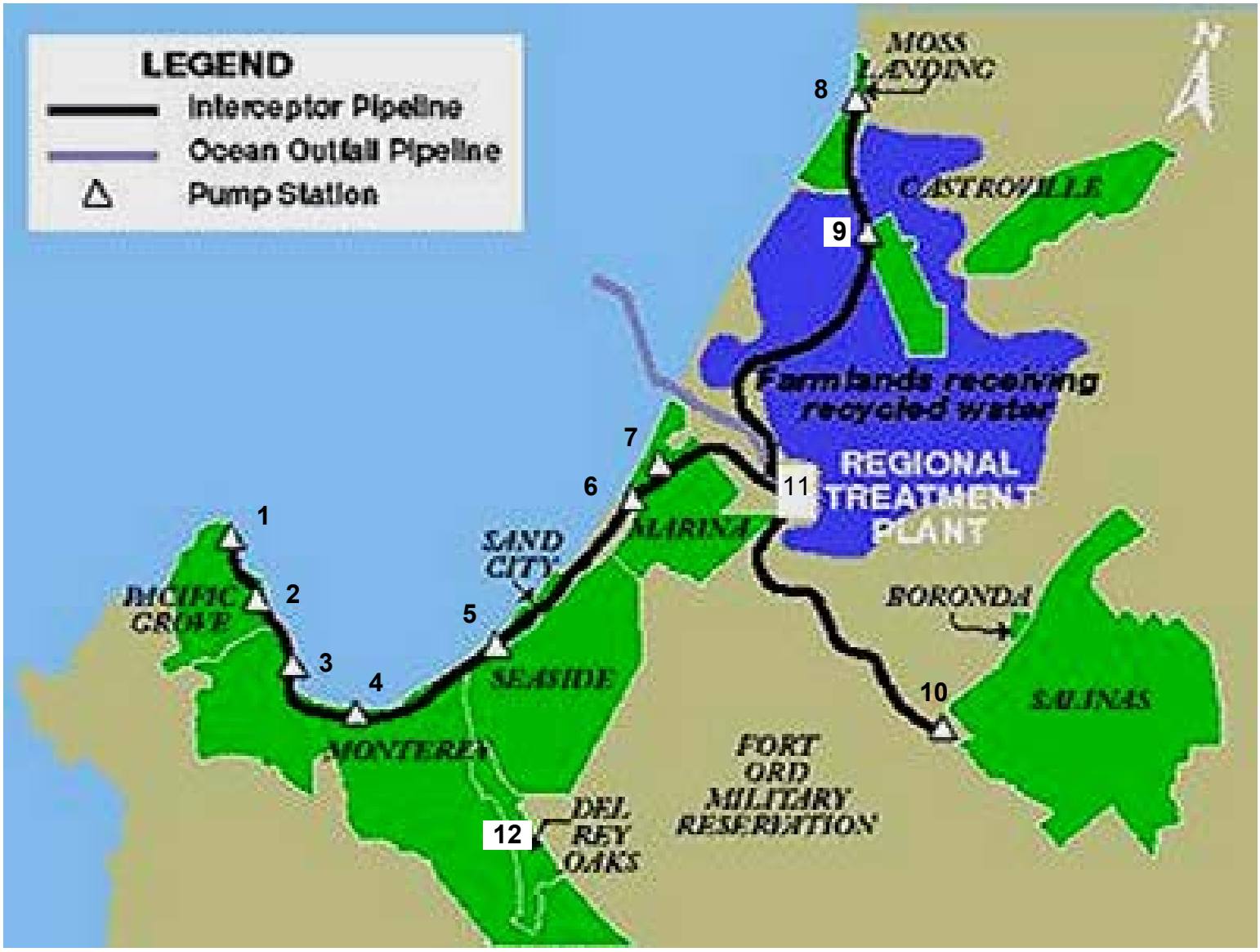
WILDFIRE HAZARDS



LEGEND

- CITY LIMIT LINES
- STREETS & HIGHWAYS
- RAILROADS
- REGIONAL INTERCEPTORS
- PUMP STATION
- VERY HIGH HAZARD
- MODERATE HAZARD
- FRA
- LRA- Low Risk

Figure 5-13
Mitigation Planning Areas



MITIGATION AREAS:

Oceanside Areas
1 - Coral Street Pump Station
2 - Fountain Avenue Pump Station
3 - Reeside Pump Station
4 - Monterey Pump Station
5 - Seaside Pump Station
6 - Fort Ord Pump Station
7 - Marina Pump Station
8 - Moss Landing Pump Station

Inland Areas
9 - Castroville Pump Station
10 - Salinas Pump Station

11 - Regional Treatment Plant

12 - Administrative Office

Appendix 5-A
MRWPCA Local Hazard Mitigation Plan
ESTIMATED IMPACTS

Area	Estimated Percentage Impacted					
	Coastal Erosion	**Coastal Storm**	**Earthquake**	**Expansive Soils**	**Flood**	**Tsunami**
Oceanside Pump Stations and Pipelines	95	95	90	25	95	95
Inland Pump Stations and Pipelines	0	0	95	25	50	50
Regional Treatment Plant	0	0	90	0	5	5
Administrative Offices	0	0	90	0	5	0

Notes

1 earthquakes. Estimates are based on the age of construction of the facilities and liquefaction potential. The RTP and Administrati e offices were both built in 1990, to current seismic

2 Oceanside pump stations have no to moderate liquefaction potential. With the exception of th Marina Pump Station, built in 1990-91, they were built prior to the current updated seismic building code standards.

3 Inland pump stations have moderate-to-high liquifaction potential. They were built between 1981 and 1983, before current seismic building codes were in effect.

4 Expansive soils could be found in the northern 1/3 of the MRWPCA area, which includes the Moss Landing and Castroville stations.

5 Flood impact estimates are based on Federal Emergency Management Agency (FEMA) Flood Rate Map (FIRM) information and area elevations.

6 Tsunami impact estimates were made using the Tsunami Evacuation Areas map, compiled by the County of Monterey Information Technology Department.

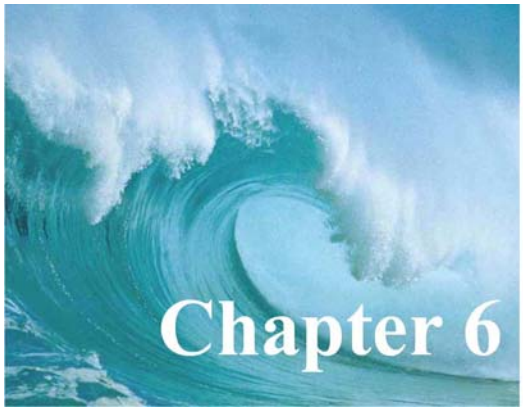
7 Coastal pump stations and the Castroville pump station are susceptible to tsunam

Appendix 5-B
MRWPCA Local Hazard Mitigation Plan
PREVIOUS OCCURRENCE FOR EACH NATURAL HAZARD

Natural Hazard	Occurrence(s)
Coastal Storm and Coastal Erosion	1982-1983
	1997-1998
Drought	1977
	1987-1992
Earthquakes	1906
	1989
	1995
	1997
Liquefaction Susceptibility	None
Expansive Soils	2000
Flood	1995
Land Subsidence	None
Landslide	None
Tsunami	1960
	1964
	1992
	2004
	2005
Wildfire	None

Appendix 5-C
MRWPCA Local Hazard Mitigation Plan
PROBABILITY OF FUTUTE EVENTS FOR EACH NATURAL HAZARD WITHIN THE PAST 100 YEARS

Natural Hazard	Occurrence(s)
Coastal Storm and Coastal Erosion	4%
Drought	6%
Earthquakes	4%
Liquefaction Susceptibility	None
Expansive Soils	1%
Flood	1%
Land Subsidence	None
Landslide	None
Tsunami	5%
Wildfire	None



Chapter 6 Mitigation Strategy

Section A. Local Hazard Mitigation Goals

Section B. Identification and Analysis of Mitigation Actions

- Mitigation Actions for Each Hazard
- Reducing the Effects of Hazards on Existing Buildings and
- Infrastructure
- Reducing the Effects of Hazards on New Buildings and Infrastructure

Section C. Implementation of Mitigation Actions

- Action Priority List
- Implementation and Administration of Mitigation Actions
- Cost-Benefit Review
- Figure

Deleted: **Section A. Local Hazard Mitigation Goals¶**
¶
Based on the risk assessment findings described in Chapter 5, the LHMP Committee has identified seven hazard mitigation goals. These goals are long-term in nature and represent ideals for the agency to strive to attain. These broad mitigation goals are:¶
¶
1. Minimize loss of life and property from hazard events¶
¶
2. Mitigate for disasters¶
¶
3. Increase public education and awareness of hazards to MRWPCA facilities so that area residents can better anticipate and prepare for them¶
¶
4. Assure that MRWPCA's essential facilities maintain operations during a disaster and afterward during recovery operations¶
¶
5 Make MRWPCA facilities more resistant to earthquake hazard¶
¶
6. Make MRWPCA transportation facilities less vulnerable to natural hazards¶
¶
<#>Prevent sewage spills to the greatest extent possible¶
¶
¶
Page Break
Section B. Identification and Analysis of Mitigation Actions¶
¶
¶
Mitigation Actions for Each Hazard¶
¶
The Committee has also identified actions, which are short-term, specific measures to be undertaken by the agency in order to achieve the seven goals identified above. Actions have been identified for coastal erosion, coastal storm, earthquake, expansive soils, flood, and tsunami. These actions are designed to reduce the effects of hazards on the service area's residents and both existing buildings and infrastructure and new buildings and infrastructure (new construction). ¶
¶
Reducing the Effects of Hazards on Existing Buildings and Infrastructure¶
¶
Two examples of actions written to mitigate for hazards to existing buildings and infrastructure are: ¶
¶
<#>Action 4.01: "Assure that essential facilities at the regional wastewate … [1]

Section A. Local Hazard Mitigation Goals

Based on the risk assessment findings described in Chapter 5, the LHMP Committee has identified seven hazard mitigation goals. These goals are long-term in nature and represent ideals for the agency to strive to attain. These broad mitigation goals are:

1. Minimize loss of life and property from hazard events

2. Mitigate for disasters

3. Increase public education and awareness of hazards to MRWPCA facilities so that area residents can better anticipate and prepare for them

4. Assure that MRWPCA's essential facilities maintain operations during a disaster and afterward during recovery operations

5 Make MRWPCA facilities more resistant to earthquake hazard

6. Make MRWPCA transportation facilities less vulnerable to natural hazards

Prevent sewage spills to the greatest extent possible

Page Break

Section B. Identification and Analysis of Mitigation Actions

Mitigation Actions for Each Hazard

The Committee has also identified actions, which are short-term, specific measures to be undertaken by the agency in order to achieve the seven goals identified above. Actions have been identified for coastal erosion, coastal storm, earthquake, expansive soils, flood, and tsunami. These actions are designed to reduce the effects of hazards on the service area's residents and both existing buildings and infrastructure and new buildings and infrastructure (new construction).

Reducing the Effects of Hazards on Existing Buildings and Infrastructure

Two examples of actions written to mitigate for hazards to existing buildings and infrastructure are:

Action 4.01: "Assure that essential facilities at the regional wastewater treatment plant and administration office are adequately protected from flooding to the greatest extent possible, in accordance with the most recent building codes"

Action 4.03: "Plan for speeding the repair and functional restoration of critical systems through stockpiling of shoring materials, temporary pumps, surface pipelines, and other supplies"

Reducing the Effects of Hazards on New Buildings and Infrastructure (New Construction)

Examples of actions to assure the safety of new construction are:

Action 2.03: "Ensure that all new construction is completed using the latest earthquake-resistant design techniques that will limit damage caused by earthquakes"

Action 2.04: "Ensure that all new construction within the 100-year flood zone is completed using design techniques that will limit damage caused by floods, using the latest edition of the California Building Code"

MRWPCA mitigation goals and actions are listed in Figure 6.1, Prioritized Goals and Actions.

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Section C. Implementation of Mitigation Actions

Action Priority List

The LHMP Committee discussed the prioritization of LHMP mitigation actions during several group meetings. Using the expertise and experience of the members of this group, the following criteria for ranking was used:

Actions given the highest priority (1) are those that involve life safety, such as those listed under Goal 1, "Minimize loss of life and property from hazard events"

Priority 2 actions are those involving hazard mitigation strategy, tracking of mitigation activities, additional geological investigations

Priority 3 actions are those which do not fit into priority 1 or 2 categories.

The mitigation actions have been listed in priority order in Figure 6.1, Prioritized Goals and Actions

Implementation and Administration of Mitigation Actions

Mitigation actions will be monitored by the LHMP Committee. It is anticipated that progress will be tracked by the use of a spreadsheet listing each mitigation goal, its purpose, mitigation actions, status, funding status, responsible department and relevant hazards.

Cost-Benefit Review

Qualitative analyses of costs and benefits were very important factors in the prioritization of mitigation actions. As more detailed information becomes available, more accurate cost-benefit ratios will be developed for mitigation projects and will be included in future updates of the LHMP.

Figure

Figure 6.1 MRWPCA Local Hazard Mitigation Plan Goals and Actions

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Chapter 6 - MITIGATION STRATEGY

Section A. Local Hazard Mitigation Goals

Based on the risk assessment findings described in Chapter 5, the LHMP Committee has identified seven hazard mitigation goals. These goals are long-term in nature and represent ideals for the agency to strive to attain. These broad mitigation goals are:

1. Minimize loss of life and property from hazard events

2. Mitigate for disasters

3. Increase public education and awareness of hazards to MRWPCA facilities so that area residents can better anticipate and prepare for them

4. Assure that MRWPCA's essential facilities maintain operations during a disaster and afterward during recovery operations

5 Make MRWPCA facilities more resistant to earthquake hazard

6. Make MRWPCA transportation facilities less vulnerable to natural hazards

7. Prevent sewage spills to the greatest extent possible

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Section B. Identification and Analysis of Mitigation Actions

Mitigation Actions for Each Hazard

The Committee has also identified actions, which are short-term, specific measures to be undertaken by the agency in order to achieve the seven goals identified above. Actions have been identified for coastal erosion, coastal storm, earthquake, expansive soils, flood, and tsunami. These actions are designed to reduce the effects of hazards on the service area's residents and both existing buildings and infrastructure and new buildings and infrastructure (new construction). The group also assigned appropriate MRWPCA personnel to each action to lead in the implementation of the mitigation strategy.

Reducing the Effects of Hazards on Existing Buildings and Infrastructure

Two examples of actions written to mitigate for hazards to existing buildings and infrastructure are:

- Action 4.01: "Assure that essential facilities at the regional wastewater treatment plant and administration office are adequately protected from flooding to the greatest extent possible, in accordance with the most recent building codes"

- Action 4.03: "Plan for speeding the repair and functional restoration of critical systems through stockpiling of shoring materials, temporary pumps, surface pipelines, and other supplies"

Reducing the Effects of Hazards on New Buildings and Infrastructure (New Construction)

Examples of actions to assure the safety of new construction are:

- Action 2.03: "Ensure that all new construction is completed using the latest earthquake-resistant design techniques that will limit damage caused by earthquakes"

- Action 2.04: "Ensure that all new construction within the 100-year flood zone is completed using design techniques that will limit damage caused by floods, using the latest edition of the California Building Code"

MRWPCA mitigation goals and actions are listed in Figure 6.1, Prioritized Goals and Actions.

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Section C. Implementation of Mitigation Actions

Action Priority List

The LHMP Committee discussed the prioritization of LHMP mitigation actions during several group meetings.
Using the expertise and experience of the members of this diverse group, a set of criteria for ranking was developed.

The group adopted a modified "STAPLEE" criteria as a systematic way to evaluate the opportunities and constraints of implementing each particular mitigation action. STAPLEE is an acronym for **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental. A category for "life safety" was added to this list. These ranking criteria are described below:

- Life Safety: The LHMP Committee considered whether each action involved life safety, such as those listed under Goal 1, "Minimize loss of life and property from hazard events" in ranking mitigation actions.
- Social: These criteria were used to determine if the public supports the overall implementation strategy and specific mitigation actions. Projects were evaluated in terms of community acceptance by considering questions such as:
  - Will the proposed action adversely affect one segment of the population?
  - Will the action disrupt established neighborhoods, or cause the relocation of lower income people?
  - Is the action compatible with present and future community values?
- Technical: Technical criteria helped determine if the proposed action is technically feasible, will help to reduce losses in the long term, and has minimal secondary impacts. To determine whether the alternative action is a whole or partial solution, or not a solution at all, the following types of issues were reviewed:
  - How effective is the action in avoiding or reducing future losses?
  - Will it create more problems than it solves?
  - Does it solve the problem or only a symptom?
- Administrative: Anticipated staffing, funding, and maintenance requirements for the mitigation action were examined to determine if the Agency has the personnel and administrative capabilities necessary to implement the action or whether outside help will be necessary. The following questions were considered:
  - Does the MRWPCA have the capability (staff, technical experts, and/or funding) to implement the action, or can it be readily obtained?
  - Can the Agency provide the necessary maintenance?
  - Can it be accomplished in a timely manner?
- Political: Political criteria were reviewed to determine how the current Board of Directors views issues related to the environment, economic development, safety, and emergency management. This also provided insight into the level of political support for mitigation activities and programs. Answers to the following questions were taken into account
  - Is there political support to implement and maintain this action?

- Have political leaders participated in the planning process so far?
- Is there a local champion willing to help see the action to completion?
- Who are the stakeholders in this proposed action?
- Is there enough public support to ensure the success of the action?
- Have all of the stakeholders been offered an opportunity to participate in the planning process?
- How can the mitigation objectives be accomplished at the lowest "cost" to the public?

- Legal: Legal issues were examined to determine whether the MRWPCA has the legal authority at the local level to implement the action, or whether new laws or regulations must first be passed. The following were considered:
  - Does the community have the authority to implement the proposed action?
  - Is there a technical, scientific, or legal basis for the mitigation action (i.e., does the mitigation action "fit" the hazard setting)?
  - Are the proper laws, ordinances, and resolutions in place to implement the action?
  - Are there any potential legal consequences?
  - Will the community be liable for the actions or support of actions, or lack of action?
  - Is the action likely to be challenged by stakeholders who may be negatively affected?
- Economic: Economic criteria were reviewed to determine which actions were cost-effective mitigation actions that could be funded in current or upcoming budget cycles. On the other hand, other actions could require general obligation bonds or other instruments that would incur long-term debt to the Agency. Note that costs were considered on a qualitative basis only. As more detailed financial information becomes available, more accurate cost-benefit ratios will be developed for mitigation projects. Economic considerations included the present economic base and projected growth and were based on answers to questions such as:
  - Are there currently sources of funds that can be used to implement the action?
  - What benefits will the action provide?
  - Does the cost seem reasonable for the size of the problem and likely benefits?
  - What burden will be placed on the tax base or local economy to implement this action?
  - Does the action contribute to other Agency economic goals, such as capital improvements or economic development?
  - What proposed actions should be considered but be "tabled" for implementation until outside sources of funding are available?
- Environmental: The committee considered the impact of each action on the environment because of public desire for sustainable and environmentally healthy communities and the many federal statutory requirements, such as the National Environmental Policy Act (NEPA). The group evaluated whether, when implementing mitigation actions, there would be negative consequences to environmental assets such as threatened and endangered species, wetlands, and other protected natural resources.
  - How will this action affect the environment (land, water, endangered species)?
  - Will this action comply with local, state, and federal environmental laws or regulations?
  - Is the action consistent with community environmental goals?

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Next, the committee ranked the feasibility of each action from 1-5 according to the modified STAPLEE criteria, with 5 being very feasible and 1 being not likely. This allowed the group to prioritize the actions based on the relative merits of each and the local conditions in which these activities would be pursued. As such, the actions with the highest total point numbers were given the highest priority. With a maximum total of 120 points, priorities were assigned as follows:

- Priority 1 = 116 – 120 points
- Priority 2 = 111 - 115 points
- Priority 3 = 101 - 110 points
- Priority 4 = 100 points or fewer

During future meetings of the LHMP Committee, the implementation strategy for the actions will be formalized. The following questions will be considered during this process:

- Where is the money going to come from?
- When is the estimated start/completion date?
- What needs to happen before the action item can be implemented?

The mitigation actions have been listed in priority order in Figure 6.1, Prioritized Goals and Actions

Implementation and Administration of Mitigation Actions

Mitigation actions will be monitored by the LHMP Committee. It is anticipated that progress will be tracked by the use of a spreadsheet listing each mitigation goal, its purpose, mitigation actions, status, funding status, responsible department and relevant hazards.

Cost-Benefit Review

Qualitative analyses of costs and benefits were very important factors in the prioritization of mitigation actions. A benefit-cost review will be conducted on proposed projects to help determine priority. As more detailed information becomes available, more accurate cost-benefit ratios will be developed for mitigation projects and will be included in future updates of the LHMP.

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Figure 6.1 . MRWPCA Local Hazard Mitigation Plan Prioritized Goals and Action¶
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Figure

Figure 6.1 MRWPCA Local Hazard Mitigation Plan Prioritized Goals and Action

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Figure 6.1
MRWPCA Local Hazard Mitigation Plan
Prioritized Goals and Actions

Goals / Actions	Priority	Evaluation of Mitigation Actions using STAPLEE Criteria: Social: Life Safety Action	Social: Community Acceptance	Social: Effect on Segment of Population	Technical: Technical Feasibility	Technical: Long-Term Solution	Technical: SecondaryImpacts	Administrative: Staffing	Administrative: Funding Allocated	Administrative: Maintenance/Operations	Political: Political Support	Political: Local Champion	Political: Public Support	Legal: State Authority	Legal: Existing Local Authority	Legal: Potential Legal Challenge	Economic: Benefit of Action	Economic: Cost of Action	Economic: Contributes to Economic Goals	Economic: Outside Funding Required	Environmental: Effect on Land / Water	Environmental: Effect on Endnagered Species	Environmental: Effect on HAZMAT / Waste Sites	Environmental: Consistent with Community Environmental Goals	Environmental: Consistent with Federal Laws	POINT TOTAL
1. Minimize loss of life and property from hazard events																										
1.01 Assure that all Agency personnel are familiar with the Business Response Plan (which describes procedures to be implemented in the event of specific localized emergencies or natural disaster) in advance of an emergency (Emergency Response Team)	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
1.02 Assure that Emergency Response Team members have adequate training to be able to respond in an emergency (Emergency Response Team)	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
1.03 Assure that evacuation is safe and efficient (Emergency Response Team)	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
1.04 Assure that communications (two-way radios, the comprehensive interior and exterior paging system) is maintained in working order (Utilities)	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
1.05 Assure that warning devices (alarm bells, horns) are all in working order (Utilities)	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
1.06 Assure that locations of primary and alternate evacuation routes, emergency exits, primary and alternate staging areas are prominently posted throughout the facility in locations that are visible to employees and visitors. (Safety Officer)	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
1.07 Provide training to appropriate employees in the handling, storage and control of hazardous materials (Safety Officer)	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
1.08 Provide training to appropriate employees in the handling of chlorine, the proper use of breathing apparatus, and what to do in case of emergency (Safety Officer)	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
1.09 Assure that all personnel who could be exposed to hazardous materials are trained in the proper use of personal protective equipment (Safety Officer)	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**

Goals / Actions	Priority	Evaluation of Mitigation Actions using STAPLEE Criteria																									POINT TOTAL
		Social			Technical			Administrative			Political			Legal			Economic				Environmental						
		Life Safety Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	SecondaryImpacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endnagered Species	Effect on HAZMAT / Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws	
2. Mitigate for disasters																											
2.01 Identify hazards and assess risk for the Agency service area through the development and maintenance of the LHMP (Safety Officer)	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
2.02 Determine increased risk from specific hazards due to location and other factors. Specific hazards addressed are coastal erosion and coastal storm, drought, earthquake, expansive soils, flood and tsunami. This will be accomplished through development and maintenance of the LHMP (Emergency Response Team and Engineering)	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
2.03 Ensure that all new construction is completed using the latest earthquake-resistant design techniques that will limit damage caused by earthquakes	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
2.04 Ensure that all new construction within the 100-year flood zone is completed using design techniques that will limit damage caused by floods, using the latest edition of the California Building Code	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
2.05 Continue to repair and make structural improvements to pipelines to enable them to perform their design capacity	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
2.06 Continue maintenance efforts to keep pipelines free of obstructions to allow for the free flow of sewage	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
2.07 Develop and implement a hazard mitigation strategy based on the risk and vulnerability assessment through the development and maintenance of the Agency LHMP (Safety Officer and Engineering)	**2**	5	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	4	2	4	5	5	5	5	5	**113**
2.08 Ascertain historical incidence and frequency of occurrence of hazards through the development and maintenance of the MRWPCA LHMP (Safety Officer)	**2**	3	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	4	2	4	5	5	5	5	5	**111**
2.09 Enhance the Agency's capability to conduct hazard risk assessments through the development and maintenance of the LHMP, and by review of the plan in 4 years and major update of the plan in 5 years (All)	**2**	4	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	4	2	4	5	5	5	5	5	**112**
2.10 Enhance the Agency's capability to track mitigation activities throughout the service area by developing a matrix containing each mitigation goal, purpose and actions, relevant hazard, along with project status, funding, and responsible department. This matrix is to be reviewed 2 years after completion of the LHMP and updated within 4 years. (Safety Officer and Engineering)	**2**	3	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	4	2	4	5	5	5	5	5	**111**

			Evaluation of Mitigation Actions using STAPLEE Criteria																										
			Social			Technical			Administrative			Political			Legal			Economic				Environmental								
Goals	**Actions**	**Priority**	Life Safety Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	SecondaryImpacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endnagered Species	Effect on HAZMAT / Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws	**POINT TOTAL**
2.11	Pursue available grant opportunities to obtain funding for mitigation activities (Engineering)	**2**	4	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	4	2	4	5	5	5	5	5	**112**
2.12	Identify mitigation measures for facilities susceptible to coastal storms and coastal erosion (Safety Officer and Engineering)	**2**	5	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	4	2	4	5	5	5	5	5	**113**
2.13	Identify mitigation measures for earthquake (Safety Officer and Engineering)	**2**	5	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	4	2	4	5	5	5	5	5	**113**
2.14	Conduct more detailed geological investigations of MRWPCA facilities to determine the risk of damage from expansive soils. (Engineering)	**2**	4	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	4	2	4	5	5	5	5	5	**112**
2.15	If evidence of expansive soils is found, identify mitigation measures for them (Engineering)	**2**	4	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	4	2	4	5	5	5	5	5	**112**
2.16	Identify mitigation measures for facilities susceptible to flood (Safety Officer and Engineering)	**2**	5	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	4	2	4	5	5	5	5	5	**113**
2.17	Identify mitigation measures for facilities susceptible to tsunami (Safety Officer and Engineering)	**2**	5	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	4	2	4	5	5	5	5	5	**113**
2.18	Work with the Tsunami Incident Response Plan Planning Group, in cooperation with the Monterey County Office of Emergency Services, to identify mitigation measures for facilities susceptible to tsunami (Safety Officer)	**2**	5	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	4	2	4	5	5	5	5	5	**113**
2.19	Continue to pursue drought protection projects for residents of the MRWPCA service area. (Engineering)	**3**	3	5	5	5	5	5	4	4	4	5	5	5	5	5	5	5	5	2	3	5	5	5	5	5	**110**
3. Increase public education and awareness of hazards to MRWPCA facilities so that																													
3.01	Coordinate with member jurisdictions to increase the level of knowledge and awareness for area residents on the hazards that routinely threaten the area and how they affect MRWPCA facilities (Engineering)	**4**	4	5	5	5	5	5	3	3	N/A	4	4	5	5	5	5	5	3	1	3	5	5	5	5	5	**100**
3.02	Coordinate with member communities to provide information to the public related to coping with disrupted sewage lines and wastewater treatment (Emergency Response Team and Engineering)	**4**	4	5	5	5	5	5	3	3	N/A	4	4	5	5	5	5	5	3	1	3	5	5	5	5	5	**100**
4. Assure that MRWPCA's essential facilities maintain operations during a disaster																													

Goals	Actions	Priority	Evaluation of Mitigation Actions using STAPLEE Criteria																													POINT TOTAL
			Social			Technical			Administrative			Political			Legal			Economic				Environmental										
			Life Safety Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	SecondaryImpacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endnagered Species	Effect on HAZMAT / Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws						
4.01	Assure that essential facilities at the regional wastewater treatment plant and administration office are adequately protected from flooding to the greatest extent possible, in accordance with the most recent building codes (Engineering)	**2**	5	5	5	5	5	5	4	4	4	5	5	5	5	5	5	5	4	3	4	5	5	5	5	5						**113**
4.02	Assure that backup systems exist for critical facilities to the greatest extent possible (Maintenance)	**2**	5	5	5	5	5	5	4	4	4	5	5	5	5	5	5	5	4	3	4	5	5	5	5	5						**113**
4.03	Plan for speeding the repair and functional restoration of critical systems through stockpiling of shoring materials, temporary pumps, surface pipelines, and other supplies (Emergency Response Team, Operations and Maintenance)	**2**	5	5	5	5	5	5	4	4	4	5	5	5	5	5	5	5	4	3	4	5	5	5	5	5						**113**
4.04	Pre-position emergency power generation capacity (or have rental/lease agreements for these generators) in critical locations to maintain continuity of MRWPCA services (Maintenance)	**2**	5	5	5	5	5	5	4	4	4	5	5	5	5	5	5	5	4	3	4	5	5	5	5	5						**113**
5. Make MRWPCA facilities more resistant to earthquake hazard																																
5.01	Explore the feasibility of completing a structural analyses of the most critical pump stations (Engineering)	**3**	4	5	5	5	5	5	4	4	4	5	5	5	5	5	5	4	4	2	3	5	5	5	5	5						**109**
5.02	Explore the feasibility of completing geotechnical investigations and consideration of replacement alternatives and joint strengthening for selected portions of the interceptors (Engineering)	**3**	4	5	5	5	5	5	4	4	4	5	5	5	5	5	5	4	4	2	3	5	5	5	5	5						**109**
5.03	Explore the feasibility of a seismic vulnerability assessment of all pump stations and to identify areas of possible liquefaction that could impact MRWPCA pipelines (Engineering)	**3**	4	5	5	5	5	5	4	4	4	5	5	5	5	5	5	4	4	2	3	5	5	5	5	5						**109**
6. Make MRWPCA transportation facilities less vulnerable to natural hazards																																

			Evaluation of Mitigation Actions using STAPLEE Criteria																												
			Social			Technical			Administrative			Political			Legal			Economic				Environmental										
Goals	**Actions**	**Priority**	Life Safety Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	SecondaryImpacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endnagered Species	Effect on HAZMAT / Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws	**POINT TOTAL**
6.01	Explore the feasibility of retaining an independent corrosion specialist to assess the condition of external corrosion on the Agency's transport system and to develop a long-term program for the maintenance of the corrosion protection system; (Engineering to participate on Corrosion Study)	**4**	3	5	5	5	5	5	3	3	3	4	4	4	5	5	4	4	3	2	2	5	5	5	5	5	**99**
6.02	Explore measures to extend the useful life of the wastewater transport system force mains beyond 100 years by implementing proper corrosion protection measures (Engineering)	**4**	3	5	5	5	5	5	3	3	3	4	4	4	5	5	4	4	3	2	2	5	5	5	5	5	**99**
6.03	joint problems and to verify the condition of the protective linings (Field Maintenance)	**4**	3	5	5	5	5	5	3	3	3	4	4	4	5	5	4	4	3	2	2	5	5	5	5	5	**99**
6.04	Provide flexibility for the discharge force main at all pumping station structures (Engineering)	**4**	3	5	5	5	5	5	3	3	3	4	4	4	5	5	4	4	3	2	2	5	5	5	5	5	**99**
7.	**Prevent sewage spills to the greatest extent possible**																														
7.01	Explore the feasibility of completing a review of the electrical control systems for the major pump stations to determine if there are enough independent operations between each of the control systems to ensure that failure of a single system or component cannot disable the entire station (Utilities)	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
7.02	Perform a feasibility study to determine if the use of supplemental containment is warranted, especially at pump stations where there are short detention times or sensitive environmental resources nearby, and where land is available (Engineering)	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**
7.03	Update long-range plans for replacement or upgrade of key equipment and systems at MRWPCA facilities (update should include an assessment of future demands on the system, the expected life and performance of equipment, the possibility of technical obsolescence, and the availability of parts) (Engineering)	**1**	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	**117**

NOTES:

1 (The responsible agency department is in parentheses after each action)

2 All = A collaborative effort by all agency departments

				Evaluation of Mitigation Actions using STAPLEE Criteria																							
				Social		Technical			Administrative			Political			Legal			Economic				Environmental					
Goals	**Actions**	**Priority**	Life Safety Action	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	SecondaryImpacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endnagered Species	Effect on HAZMAT / Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws	**POINT TOTAL**

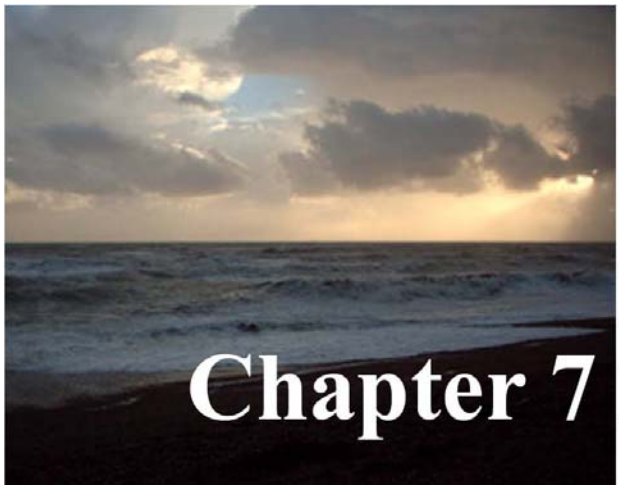
3 Priorities are as follows:
1 = Highest Priority
2 = High Priority
3 = Medium Priority
4 = Low Priority

4 Points ranging from 1 to 5 are given under evaluation criteria, with 1 being the lowest ranking and 5 the highest.

5 Point totals correspond to Priorities as follows:
116 - 120 points = Priority 1
111 - 115 points = Priority 2
101 - 110 points = Priority 3
fewer than 100 points = Priority 4

6 For more detailed description of evaluation criteria, refer to Chapter 6.

7 Note that this is a dynamic document and point values will be evaluated and revised periodically as approproate.



Chapter 7 Plan Maintenance Process

Section A. Monitoring, Evaluating, and Updating the Plan

- Gaps in the Current LHMP
- Method and Schedule for Monitoring, Evaluating and Updating the Plan
- Method and Schedule for Updating the Plan Within the Five-Year Cycle

Section B. Incorporation into Existing Planning Mechanisms

- Other Local Planning Mechanisms
- Process for Incorporation of Appropriate Requirements into Other Plans

Section C. Continued Public Involvement

- Planned Continued Involvement Activities

Chapter 7. PLAN MAINTENANCE PROCESS

Section A. Monitoring, Evaluating, and Updating the Plan

Gaps in the Current LHMP

The best available current information was used when the Monterey Regional Water Pollution Control Agency Local Hazard Mitigation Plan was written. As soon as appropriate information is available, existing gaps in data will be filled. The following areas will be updated in future editions of the LHMP:

- A more thorough soils investigation will be done into the potential of expansive soils affecting MRWPCA facilities
- If evidence of expansive soils is found, a strategy will be developed to mitigate for this condition
- More accurate financial data on infrastructure value and replacement value will be obtained
- An investigation will be done into the feasibility of utilizing HAZUS software for the assessment of damages to MRWPCA facilities from natural hazards

Method and Schedule for Monitoring, Evaluating and Updating the Plan

The MRWPCA Local Hazard Mitigation Plan is intended to be a dynamic document which will be updated periodically. While the official version of the plan will be bound, a three-ring binder format will be made for members of the Local Hazard Mitigation Committee, in order to keep the document easy to use, review and update.

The Local Hazard Mitigation Plan Committee will be responsible for overseeing implementation of the hazard mitigation strategy. The committee will start a major update of the risk and vulnerability assessment and mitigation strategy sections of the plan within four years of FEMA approval. The plan will be fully up-to-date within the five-year cycle, as required by FEMA.

The four-year review will include the following monitoring and evaluation tasks:

- Notable changes in the Agency's risk to natural or manmade hazards
- Impacts of land development activities and related programs on hazard mitigation
- Progress on the implementation of the plan. If necessary, this will include identification of problems and suggested improvements. Progress will be tracked by the use of a spreadsheet listing each mitigation goal, its purpose, mitigation actions, status, funding status, responsible department and relevant hazards
- Actual progress implementing the plan versus expectations
- The adequacy of resources for the implementation of the plan

Method and Schedule for Updating the Plan Within the Five-Year Cycle

The plan was adopted by the Board of Directors of the Monterey Regional Water Pollution Control Agency on February 24, 2006 and it is anticipated that it will be approved by the Federal Emergency Management Agency in June of 2006. As stated above, the MRWPCA LHMP Committee will begin a major plan update four years after FEMA approval and will have the update completed within the five-year cycle.

Section B. Incorporation into Existing Planning Mechanisms

Other Local Planning Mechanisms and Process for Incorporation of Appropriate Requirements into Other Plans

Several MRWPCA documents include suggested mitigation measures for the impacts of natural and man-made hazards. The MRWPCA Business Response Plan gives mitigation measures for natural and man-made hazards. In addition, the Seismic Vulnerability Evaluation, Wastewater Collection System, Monterey Regional Water Pollution Control Agency, the Review of Potential Damage to Force Mains at 10 Pump Stations due to Long-Term Settlement for the Monterey Regional Water Pollution Control Agency; and the Enhanced Spill Prevention Plan include suggested mitigation for earthquake, settlement and spills. The Local Hazard Mitigation Plan includes input from the above documents and formalizes mitigation strategies. After the agency officially adopts the Local Hazard Mitigation Plan, it will become the official planning document for hazard mitigation strategies. Additionally, the plan will be submitted to Monterey County Office of Emergency Services for their use and inclusion to the Monterey County Local Hazard Mitigation Plan.

Section C. Continued Public Involvement

Planned Continued Involvement Activities

The Monterey Regional Water Pollution Control Agency will encourage the public to participate in the ongoing updating of the Local Hazard Mitigation Plan. Public access to the plan and to the various revision processes will be made through mechanisms described below:

- Copies of the plan will be kept on hand at the Regional Treatment Plant, located at 14201 Del Monte Boulevard, Marina and at the Administrative Office, at 5 Harris Court, Monterey.

- Contained in the hard copies of the plan are the address and phone number of the MRWPCA Local Hazard Mitigation Plan Working Group contact person, who is responsible for monitoring public comments and accepting suggestions regarding plan revisions.

- A downloadable copy of the plan and any proposed changes will be posted on the Agency's website (www.mrwpca.org), This site will also contain an email address and phone number to which people can direct their comments or concerns.

- Future updates of the plan will be discussed at Board of Directors meetings, which are open to the public. Members of the public are welcome to attend these meetings and to make comments on the plan.

- Changes or updates to the MRWPCA Business Response, Hazardous Communication, and Hazardous Waste plans will be highlighted in the Local Hazard Mitigation Plan. Like wise, updates on newly identified hazards and its mitigation procedures identified in MRWPCA's Local Hazard Mitigation Plan will also be highlighted in the respective plans as a cross reference.

Any public comments received relative to the plan will be collected and will be included in reports to the Board of Directors and will also be considered by the Local Hazard Mitigation Plan Committee during future plan updates.